DOCUMENT RESUME

ED 385 752 CE 069 677

TITLE Automotive Technician. A Competency-Based Curriculum Designed To Prepare Students for Entry-Level Employment.
INSTITUTION Maine Association of Vocational Education Administrators.; Vocational Curriculum Resource Center of Maine, Fairfield.
PUB DATE 95
NOTE 215p.
PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC09 Plus Postage.
DESCRIPTORS *Auto Mechanics; Behavioral Objectives; *Competency Based Education; Engines; Entry Workers; Job Skills; Learning Activities; Motor Vehicles; Secondary Education; State Curriculum Guides; Student Evaluation; Units of Study; Vocational Education
IDENTIFIERS Maine

ABSTRACT

This curriculum guide is designed to assist instructors in the development and implementation of a comprehensive, competency-based automotive curriculum. It contains an instructional unit for each task listed on the enclosed job analysis or DACUM (Developing a Curriculum) chart. These units include introduction, performance objectives, suggested implementation strategies or student learning activities, evaluation standard, resources, and special notes. These units are grouped under the duty to which they pertain. The curriculum consists of these 14 duties: perform scheduled maintenance functions; conduct exhaust system functions; conduct engine cooling system functions; conduct brake functions; conduct body component functions; conduct steering/suspension system functions; conduct electrical system functions; conduct accessory system functions; conduct air conditioning/heating system functions; conduct engine mechanical functions; conduct emissions system functions; conduct fuel system functions; conduct manual drive train component functions; and conduct automatic drive train component functions. Four to 14 tasks are contained in each duty. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 385 752

AUTOMOTIVE TECHNICIAN 1995

CRCOM

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

S. Doran

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)"

A COMPETENCY-BASED CURRICULUM DESIGNED TO PREPARE STUDENTS FOR ENTRY-LEVEL EMPLOYMENT

Developed by:

Maine Secondary Automotive Instructors

Curriculum Resource Center of Maine

BEST COPY AVAILABLE

Maine Association of Vocational Education Administrators

Maine Works

CE 069 677

TABLE OF CONTENTS

ACKNOWLEDGMENTS 7

ENDORSEMENT 8

INTRODUCTION 9

  Project History 9
  Validation Process 9
  Occupational Process 9

USE OF THIS PUBLICATION 10

DACUM CHART .... Binder Pocket

OCCUPATIONAL OUTLOOK 11

APPENDIX .... Tab O

  Units To Be Developed: (TBD)
    Balance Tires
    Diagnose Problem Areas
  Student Competency Profile

UNITS OF INSTRUCTION .... Tabs A-N

  Units "To Be Developed" (TBD)
  Entry Level Tasks (*)

A. PERFORM SCHEDULED MAINTENANCE FUNCTIONS

A-1 Identify Make, Model, Vin, and Year Numbers *
A-2 Perform Visual Safety Check *
A-3 Perform Chassis Lubrication *
A-4 Change Oils and Fluids *
A-5 Change Filters *
A-6 Check Fluid Levels *
A-7 Inspect Tire Pressure and Wear *
A-8 Change Tires, Rotate and Mount *
A-9 Balance Tires * (TBD)
A-10 Lubricate Hinges, Locks, and Weather Strips *

A-11 Document Serviced Performed *
A-12 Check Vehicle Inspection and Registration Stickers *
A-13 Clean Vehicle Interior *
A-14 Clean Vehicle Exterior *

B. CONDUCT EXHAUST SYSTEM FUNCTIONS

B-1 Diagnose Exhaust Condition *
B-2 Repair Defective Components *
B-3 Replace Defective Components *
B-4 Verify Repairs *

C. CONDUCT ENGINE COOLING SYSTEM FUNCTIONS

C-1 Identify Cooling Systems/Components *
C-2 Diagnose Cooling System *
C-3 Service Cooling System *
C-4 Repair Defective Component(s) *
C-5 Replace Defective Component(s) *
C-6 Verify Repairs *

D. CONDUCT BRAKE FUNCTIONS

D-1 Identify Brake System *
D-2 Diagnose System Condition *
D-3 Perform Mechanical Function Check *
D-4 Perform Vacuum System Check *
D-5 Perform Electrical System Check *
D-6 Perform Hydraulic System Check *
D-7 Repair Parts
D-8 Replace Parts *
D-9 Verify Repairs *

E. CONDUCT BODY COMPONENT FUNCTIONS

E-1 Identify Chassis/Body Components *
E-2 Diagnose Chassis/Body Components
E-3 Check Wind, Noise and Vibrations
E-4 Conduct Visual Check (sheet metal, fixed glass, windows, door locks) *
E-5 Inspect for Water Leakage *
E-6 Adjust Lighting *
E-7 Adjust Body Fits
E-8 Repair Defective Components

E-9 Replace Defective Components
E-10 Verify Repairs *

F. CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS

F-1 Identify Steering/Suspension System *
F-2 Identify Problem Area/Type *
F-3 Perform Visual System Check *
F-4 Diagnose Steering System
F-5 Diagnose Suspension System
F-6 Repair Defective Components
F-7 Replace Defective Components *
F-8 Perform Alignment
F-9 Verify Repairs

G. CONDUCT ELECTRICAL SYSTEM FUNCTIONS

G-1 Identify Electrical System *
G-2 Identify Problem Area
G-3 Perform Visual Check *
G-4 Analyze Charging System
G-5 Analyze Starting System
G-6 Analyze Ignition System
G-7 Analyze Chassis/Body Electrical
G-8 Test Problem Area Components
G-9 Repair Defective Components
G-10 Replace Defective Components *
G-11 Verify Repairs

H. CONDUCT ACCESSORY SYSTEM FUNCTIONS

H-1 Identify Accessory Systems *
H-2 Identify Problem Area/Type
H-3 Test Electrical Functions
H-4 Test Mechanical Functions
H-5 Test Vacuum System
H-6 Isolate Noises
H-7 Repair System Problem
H-8 Replace System Components *
H-9 Verify Repairs

I. CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS

I-1	Identify Heating/Air Conditioning Systems *
I-2	Perform Visual/Hands-On Check *
I-3	Test Mechanical Operations
I-4	Test Electrical Operations
I-5	Test Vacuum System and Actuators
I-6	Test Temperatures in Circulation System *
I-7	Test System for Leaks
I-8	Repair Defective Components
I-9	Replace Defective Components
I-10	Charge Air Conditioning Systems
I-11	Verify Repairs

J. CONDUCT ENGINE MECHANICAL FUNCTIONS

J-1	Identify Engine Type *
J-2	Analyze Mechanical Operation
J-3	Perform Visual Components Check
J-4	Identify Engine Problem Area
J-5	Check for Unusual Noises
J-6	Analyze Engine Systems
J-7	Isolate Problem Components (Tear Down/Inspect)
J-8	Repair Defective Engine Components
J-9	Replace Defective or Engine Components
J-10	Verify Repairs

K. CONDUCT EMISSIONS SYSTEM FUNCTIONS

K-1	Identify Emissions Systems *
K-2	Perform Visual System Check *
K-3	Perform Functional Check of System
K-4	Analyze Exhaust Gasses
K-5	Diagnose Problem Area
K-6	Repair Defective Components
K-7	Replace Defective Components *
K-8	Verify Repairs

L. CONDUCT FUEL SYSTEM FUNCTIONS

L-1	Identify Fuel System *
L-2	Perform Visual System Check *
L-3	Diagnose Fuel System
L-4	Isolate Defective Components

L-5 Repair Defective Components
L-6 Replace Defective Components *
L-7 Verify Repairs

M. CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS

M-1 Identify Manual Drive Train Components *
M-2 Perform Visual Check *
M-3 Diagnose Problem Areas
M-4 Perform External Adjustments
M-5 Repair Defective Drive Train Components
M-6 Replace Defective Drive Train Components *
M-7 Service Clutch Assembly *
M-8 Verify Repairs

N. CONDUCT AUTOMATIC DRIVE TRAIN COMPONENT FUNCTIONS

N-1 Identify Automatic Drive Train Components *
N-2 Perform Visual Check *
N-3 Diagnose Problem Area (TBD)
N-4 Perform External Adjustments
N-5 Repair Defective Drive Train Components
N-6 Replace Defective Drive Train Components
N-7 Verify Repairs

ACKNOWLEDGMENTS

Appreciation is extended to the many individuals who contributed their time and expertise to the development of AUTOMOTIVE TECHNICIAN.

A special thank you goes to the following DACUM Committee members:

Brian Barlett	Bangor Ford, Bangor
Steve Carmichael	Forest City Motors, Portland
Greg Cyr	Lee Cadillac/Olds, Auburn
Tom Donnell	Morrison Chevrolet, Ellsworth
Robert Malenfant	Caribou Engine, Caribou
Peter Mathieson	Self-Employed Mechanic, Hallowell
Raymond Rogers	Dutch Buick/Chevrolet/Olds, Belfast
Noah Smith	In-Town Tune-Up, Portland

Another special thank you goes to the following Automotive Technician Instructors for their effort and insight in the development of this curriculum:

Frank Dumont	United Technology Center, Bangor
Gary Fortin	Sanford Regional Vocational Center
Doug Gauthier	Dexter Regional Vocational Center
Mitchell Green	Lake Region Vocational Center, Bridgton
Mark Jones	Caribou Regional Vocational Center
Hugh Libby	Westbrook Regional Vocational Center
Peter Mathieson	Waldo County Vocational Center, Belfast
Neil McKay	Hancock County Technical Center, Ellsworth
David Murphy	Skowhegan Regional Vocational Center
Daniel Reny	Capitol Area Technical Center, Augusta
Merton Rivers	Norther Penobscot Vocational Center, Lincoln
David Shedd	Norther Penobscot Vocational Center, Lincoln
John Walker	United Technology Center, Bangor
Collin White	Kenneth Foster Applied Technology Center, Farmington

An extra special thank you is extended to Mitch Green at Lake Region Vocational Center and Hugh Libby at Westbrook Applied Technical Center for their "above-and-beyond the call of duty" efforts in getting this document completed.

FACILITATORS:

Mike Kane, Director	Westbrook Regional Vocational Center
Thom Birmingham, Director	Mid-Coast School of Technology
Susan N. Donar, Director	Curriculum Resource Center of Maine

Appreciation goes to the Curriculum Resource Center of Maine for supplying all the necessary resources and references utilized in the development of this curriculum.

Angus S. King, Jr.
Governor

Wayne L. Mowatt, Ed.D.
Commissioner

DEPARTMENT OF EDUCATION

Telephone (207) 287-5800
TDD (207) 287-2550

July, 1995

This AUTOMOTIVE TECHNICIAN curriculum was developed collaboratively by the Maine Association of Vocational Education Administrators, the Curriculum Resource Center of Maine, and Automotive Technology instructors throughout Maine.

It is the purpose of this publication to assist instructors in the development and implementation of a comprehensive, competency-based automotive curriculum.

We would like to thank the representatives from the automotive trades who provided technical assistance in the identification of the duties and tasks for the "Automotive Technician DACUM" and to thank the individual curriculum committee members who translated this information into a working document.

Sincerely,

Wayne Mowatt

Wayne L. Mowatt, Ed.D.
Commissioner
Department of Education

Christopher D. Lyons

Christopher D. Lyons
Director
Division of Applied Technology

lln

23 State House Station, Augusta, Maine 04333-0023 — *Offices Located at* the Education Building
An Equal Opportunity Employer

INTRODUCTION

PROJECT HISTORY

The Bureau of Adult & Secondary Vocational Education initiated a curriculum development project in 1988 in collaboration with vocational directors, teachers, industry professionals, and staff from the University of Southern Maine to develop a competency-based, industry-validated curriculum in each of the program areas offered at vocational centers and regions throughout Maine. This project has provided an opportunity for directors and teachers to expand their knowledge and skills related to the process of job task analysis and curriculum development.

The Bureau and Vocational Directors selected the Developing A Curriculum (DACUM) model process to initiate curriculum development in vocational education in Maine. DACUM is an innovative approach to occupational analysis, which has been proven to be an effective method of identifying the duties and tasks which must be performed by individuals employed within a specific occupational area.

The curriculum for each program area was written in competency-based terms by a team of teachers within the program area and provides a model for adaption by the classroom instructor, which can be updated as or personalized. The bureau and the vocational directors view curriculum development as an ongoing and essential component in the development of comprehensive, industry-validated, competency-based curricula.

VALIDATION PROCESS

The Job Analysis (DACUM chart) was developed by professionals from throughout the State of Maine. These professionals identified essential duties and tasks performed at the entry-level. (See attached DACUM chart.)

Once developed, the duty and task listing was distributed to secondary vocational education program advisory boards throughout Maine for validation. The purpose of this review was to correct any omissions or to delete unnecessary material.

OCCUPATIONAL OUTLOOK

In an effort to provide staff and students with current information concerning employment opportunities, the Maine Occupational Information Coordinating Committee developed specific occupational outlook units for inclusion in each competency-based curriculum. These units provide job descriptions, work environment descriptions, education and training requirements, skills and aptitude requirements, salary information and local, state, and national employment opportunities.

USE OF THIS PUBLICATION

This publication contains instructional units for each task listed on the job analysis (DACUM Chart). These units include:

- Introduction
- Performance Objectives
- Suggested Implementation Strategies
- Evaluations
- Resources
- Special Notes

The instructor should study each unit carefully to determine the following:

1. Amount of material to be covered in each class period.
2. Skills to be demonstrated.
3. Supplemental materials that must be gathered or ordered (supplies, equipment, etc.)
4. Additional resources that could be brought in for presentation (guest speakers, resources, etc.)

The instructor may, and is encouraged to, add to this curriculum to better fit the needs of the student and the community.

COMPETENCY PROFILE
FOR
AUTOMOTIVE TECHNICIAN

VOCATIONAL CURRICULUM RESOURCE CENTER OF MAINE
Kennebec Valley Technical College
92 Western Avenue
Fairfield, ME 04937-1367
(207) 453-5170

Revised - 1994

COMPETENCY PROFILE: AUTOMOTIVE TECHNICIAN

(★ = Entry-Level Skills)

← TASKS →

A. Perform Scheduled Maintenance Functions	★ A-1 Identify Make, Model, VIN, and Year Numbers	★ A-2 Perform Visual Safety Check	★ A-3 Perform Chassis Lubrication	★ A-4 Change Oils and Fluids	★ A-5 Change Filters	★ A-6 Check Fluid Levels	★ A-7 Inspect Tire Pressure and Wear	★ A-8 Change Tires, Rotate and Mount
	★ A-9 Balance Tires	★ A-10 Lubricate Hinges, Locks, and Weather Strips	★ A-11 Document Service Performed	★ A-12 Check Vehicle Inspection and Registration Stickers	★ A-13 Clean Vehicle Interior	★ A-14 Clean Vehicle Exterior		
B. Conduct Exhaust System Functions	★ B-1 Diagnose Exhaust Condition	★ B-2 Repair Defective Components	★ B-3 Replace Defective Components	★ B-4 Verify Repairs				
C. Conduct Engine Cooling System Functions	★ C-1 Identify Cooling Systems/Components	★ C-2 Diagnose Cooling System	★ C-3 Service Cooling System	★ C-4 Repair Defective Component(s)	★ C-5 Replace Defective Component(s)	★ C-6 Verify Repairs		
D. Conduct Brake System Functions	★ D-1 Identify Brake System	★ D-2 Diagnose System Condition	★ D-3 Perform Mechanical Function Check	★ D-4 Perform Vacuum System Check	D-5 Perform Electrical Function Check	★ D-6 Perform Hydraulic System Check	D-7 Repair Parts	★ D-8 Replace Parts
	★ D-9 Verify Repairs							
E. Conduct Body Component Functions	★ E-1 Identify Chassis/Body Components	E-2 Diagnose Chassis/Body Components	E-3 Check Wind, Noise and Vibrations	★ E-4 Conduct Visual Check (sheet metal, fixed glass, windows, door locks)	★ E-5 Inspect for Water Leakage	★ E-6 Adjust Lighting	E-7 Adjust Body Fits	E-8 Repair Defective Components
	E-9 Replace Defective Components	★ E-10 Verify Repairs						
F. Conduct Steering/Suspension System Functions	★ F-1 Identify Steering/ Systems	★ F-2 Identify Problem Area/ Type	★ F-3 Perform Visual System Check	F-4 Diagnose Steering System	F-5 Diagnose Suspension System	F-6 Repair Defective Components	★ F-7 Replace Defective Components	F-8 Perform Alignment
	F-9 Verify Repairs							
G. Conduct Electrical System Functions	★ G-1 Identify Electrical System	G-2 Identify Problem Area	★ G-3 Perform Visual Check	G-4 Analyze Charging System	G-5 Analyze Starting System	G-6 Analyze Ignition System	G-7 Analyze Chassis/Body Electrical	G-8 Test Problem Area Components
	G-9 Repair Defective Components	★ G-10 Replace Defective Components	G-11 Verify Repairs					
H. Conduct Accessory System Functions	★ H-1 Identify Accessory Systems	H-2 Identify Problem Area/ Type	H-3 Test Electrical Functions	H-4 Test Mechanical Functions	H-5 Test Vacuum System	H-6 Isolate Noises	H-7 Repair System Problem	★ H-8 Replace System Components
	H-9 Verify Repairs							
I. Conduct Air Conditioning/Heating System Functions	★ I-1 Identify Heating/Air Conditioning Systems	★ I-2 Perform Visual/ Hands-On Check	I-3 Test Mechanical Operations	I-4 Test Electrical Functions	I-5 Test Vacuum System and Actuators	★ I-6 Test Temperatures in Circulation System	I-7 Test System for Leaks	I-8 Repair Defective Components
	I-9 Replace Defective Components	I-10 Charge Air Conditioning Systems	I-11 Verify Repairs					
J. Conduct Engine Mechanical Functions	★ J-1 Identify Engine Type	J-2 Analyze Mechanical Operation	J-3 Perform Visual Components Check	J-4 Identify Engine Problem Area	J-5 Check for Unusual Noises	J-6 Analyze Engine Systems	J-7 Isolate Problem Components (Tear Down/ Inspect)	J-8 Repair Defective Engine Components
	J-9 Replace Defective or Engine Components	J-10 Verify Repairs						
K. Conduct Emissions System Functions	★ K-1 Identify Emissions Systems	★ K-2 Perform Visual System Check	K-3 Perform Functional Check of System	K-4 Analyze Exhaust Gasses	K-5 Diagnose Problem Area	K-6 Repair Defective Components	★ K-7 Replace Defective Components	K-8 Verify Repairs
L. Conduct Fuel System Functions	★ L-1 Identify Fuel System	★ L-2 Perform Visual System Check	L-3 Diagnose Fuel System	L-4 Isolate Defective Components	L-5 Repair Defective Components	★ L-6 Replace Defective Components	L-7 Verify Repairs	
M. Conduct Manual Drive Train Component Functions	★ M-1 Identify Manual Drive Train Components	★ M-2 Perform Visual Check	M-3 Diagnose Problem Areas	M-4 Perform External Adjustments	M-5 Repair Defective Drive Train Components	★ M-6 Replace Defective Drive Train Components	★ M-7 Service Clutch Assembly	M-8 Verify Repairs
N. Conduct Automatic Drive Train Component Functions	★ N-1 Identify Automatic Drive Train Components	★ N-2 Perform Visual Check	N-3 Diagnose Problem Areas	N-4 Perform External Adjustments	N-5 Repair Defective Drive Train Components	★ N-6 Replace Defective Drive Train Components	N-7 Verify Repairs	

DACUM COMMITTEE MEMBERS

Brian Bartlett, Bangor Ford, Bangor

Steve Carmichael, Forest City Motors, Portland

Greg Cyr, Lee Cadillac/Olds, Auburn

Tom Donnell, Morrison Chevrolet, Ellsworth

Robert Malenfant, Caribou Engine, Caribou

Peter Mathieson, Self-Employed Mechanic, Hallowell

Raymond Rogers, Dutch Buick/Chevrolet/Olds, Belfast

Noah Smith, In-Town Tune-Up, Portland

Sponsored by: Maine Association of Vocational Education Administrators (MAVEA)

Organized by: Susan N. Donar, Director
Vocational Curriculum Resource Center of Maine

Facilitated by: Mike Kane, Director
Westbrook Regional Vocational Center

Thom Birmingham, Director
Mid-Coast School of Technology

Susan N. Donar, Director
Vocational Curriculum Resource Center of Maine

Copies Obtained from: Vocational Curriculum Resource Center of Maine
92 Western Avenue
Fairfield, ME 04937-1367
(207) 453-5170

Revision Committee:
Frank Dumond, United Technology Center, Bangor
Gary Fortin, Sanford Regional Vocational Center
Doug Gauthier, Dexter Regional Vocational Center
Mitchell Green, Lake Region Vocational Center, Bridgton
Mark Jones, Caribou Regional Vocational Center
Hugh Libby, Westbrook, Regional Vocational Center
Peter Mathieson, Waldo County Vocational Center, Belfast
Neil McKay, Hancock County Technical Center, Ellsworth
David Murphy, Skowhegan Regional Vocational Center
Daniel Reny, Capitol Area Technical Center, Augusta
Merton Rivers, Northern Penobscot Vocational Center, Lincoln
David Shedd, Northern Penobscot County Vocational Center, Lincoln
John Walker, United Technologies Center, Bangor
Collin White, Kenneth Foster Applied Technology Center, Farmington

AUTOMOTIVE MECHANICS AND TECHNICIANS: THE MAINE SCENE

Information specific to Maine was gathered by MOICC staff and was taken from data developed by the Division of Economic Research and Analysis of the Maine Department of Labor, the Division of Research and Statistics of the Bureau of Labor Standards, the Maine Department of Education, and the Maine Technical Colleges.

Employment Projections

There were 4,908 automotive mechanics and technicians employed in Maine in 1992. This figure is expected to climb to 5,800 in the year 2005, an increase of 18.2 percent. A total of 208 jobs are projected to be available annually between 1992 and 2005 in Maine. Of these, 69 are expected to occur because of growth in the industries employing automotive mechanics and technicians and another 139 job openings should occur due to the need to replace workers who leave this occupation for a number of reasons.

Training Opportunities

Automotive mechanics and technicians can learn basic skills of this occupation in 22 of Maine's secondary vocational-technical schools. In addition, more advanced automotive technician programs are offered at Central Maine, Eastern Maine, Northern Maine, Southern Maine and Washington County Technical Colleges.

The increasing use of computer technology to operate modern vehicles makes it necessary for students to become proficient in basic theories of electronics prior to entering specific automotive mechanic or technician training programs. Basic automotive mechanic skills can be learned while working on the job. In recent years, automotive repair shops have become specialized, with some dealing exclusively with repairing the electronic components of a vehicle's overall operating plant.

Earnings [1]

Automotive mechanics and technicians in Maine work in a variety of settings. The following is a grid depicting wages for automotive mechanics and technicians in Maine.

	1993 Estimated Mean	Survey Data			
		Mean (Hourly)	Mean (Annual)	Median	Mid-Range
Statewide, Across All Industries	$10.64				
Automotive Dealers and Service Stations (SIC 55, 1991 Survey)	$10.96	10.10	21,008	9.70	7.70-11.80
Auto Repair Services & Parking (SIC 75, 1993 Survey)		10.20	21,216	9.90	8.10-11.50

---

[1] Wage data obtained from 1993 Maine Occupational Wages, Maine Department of Labor, Division of Economic Analysis and Research

Related Occupations

Persons with auto mechanics and technician skills can also be employed as inside sales persons for auto parts stores or for the auto parts department of automobile dealers.

Job Outlook

Employment opportunities for automotive mechanics and technicians are expected to increase more quickly than the average for all occupations between 1992 and the year 2005. Although competition for these jobs should be strong due to the oversupply of newly trained workers, there is currently a better balance between demand for and supply of trained auto mechanics and technicians than in the past. Program completion data for 1994 indicate that approximately 240 secondary vocational program graduates and 90 Technical College graduates completed automotive mechanic or automotive technician programs. This compares with the projected need of 208 individuals annually to the year 2005 according to the latest projections. The supply-demand ratio is approximately 1.6 completers for every projected opening. This ratio further indicates a somewhat competitive situation for workers seeking automotive mechanic and technician opportunities.

Most auto mechanics and technicians in Maine work in auto dealerships and service stations (SIC 55), auto repair shops (SIC 75), or are self-employed. Geographically, employment of automotive mechanics and technicians in 1992 was scattered across Maine as follows:

Maine, Statewide		4,908
Sub-State Area (Counties)		Percent
Eastern	(Hancock, Penobscot, Piscataquis)	20.4
Northern	(Aroostook, Washington)	10.2
Coastal	(Knox, Lincoln, Sagadahoc, Waldo)	7.7
Central	(Kennebec, Somerset)	15.9
Western	(Androscoggin, Frnaklin, Oxford)	13.7
Southern	(Cumberland, York)	32.1

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS**

TASK: A-1 Identify Make, Model, VIN, and Year Numbers *

II. INTRODUCTION:

In order to correctly diagnose a vehicle for parts, specs, and procedures, a student must be able to identify the make, model, VIN, and year of a vehicle.

III. PERFORMANCE OBJECTIVES:

Determine Make
Determine Model
Determine Year
Locate VIN
Interpret VIN

IV. STUDENT LEARNING ACTIVITIES:

Discuss location of year, make, VIN, and model on vehicles.
Demonstrate breakdown/parts of VIN and discuss what each part tells you about the vehicle.
Have students locate year, make, VIN, and model numbers on a variety of vehicles.

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will locate year, make, model, and VIN numbers with 100 percent accuracy.

VI. RESOURCES:

Manufacturer Manuals
Repair Manuals
Shop Manuals

VII. SPECIAL NOTES:

It is suggested to continually, verbally quiz students on this task throughout the year as they work on different vehicles to keep the importance of this task clear in their minds.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS

TASK: A-2 Perform Visual Safety Check *

II. INTRODUCTION:

Vehicle must be checked for possible safety defects in certain areas. These checks are done to detect a part or component that is a potential safety hazard and replace it before it breaks or causes injury.

III. PERFORMANCE OBJECTIVES:

Detect loose or worn parts that could be a possible safety hazard

IV. STUDENT LEARNING ACTIVITIES:

Student will identify faulty shocks, exhaust, front end components, tires, floor boards, brake components, glass.

V. EVALUATIONS:

Student will demonstrate the procedure followed and consult the manual when needed.

VI. RESOURCES:

Shop manuals
Textbooks
Film strips

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS

TASK: A-3 Perform Chassis Lubrication *

II. INTRODUCTION:

Chassis lubrication is done to allow close fitting parts to rotate freely and to extend their life. Without periodic chassis lubrication, these components would rust, corrode, and break due to exposure to dirt and water.

III. PERFORMANCE OBJECTIVES:

The student will learn to:
- Locate and identify grease fitting
- Install grease in the fitting

IV. STUDENT LEARNING ACTIVITIES:

Raise vehicle with life or a jack stand
Locate lubrication points and lubricate
Select proper grease
Check fluid levels

V. EVALUATIONS:

Given proper instruction/demonstration, the student will complete a check sheet and use the proper grade and quality grease to perform chassis lubrication.

VI. RESOURCES:

Specs manual
Owner's manual

VII. SPECIAL NOTES:

Follow all safety procedures
Lifting instruction

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS

TASK: A-4 Change Oil and Fluids *

II. INTRODUCTION:

An automotive technician must know how to change the oil in a safe and reliable manner and to determine the time and mileage specifications between changes. The technician must also know how to resource the information from reference material in order to properly change the oil on a variety of vehicles. These skills are important to the overall maintenance of the vehicle engine.

III. PERFORMANCE OBJECTIVES:

Students will learn to change oil and fluids on a variety of vehicles.
Students will complete an oil/fluid change checklist.
Students will verify that each component on the oil/fluid change checklist is completed.

IV. STUDENT LEARNING ACTIVITIES:

Raise vehicle
Position drain pan under drain plugs
Know the different grade oils to be used

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will follow a check sheet utilize the proper grade and quality of oil and perform an oil change as well as change all appropriate vehicle fluids.

VI. RESOURCES:

Resources manuals
Vehicle manuals

VII. SPECIAL NOTES:

Student will wear safety glasses and use safe lifting equipment and procedures.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS**

TASK: A-5 Change Filters *

II. INTRODUCTION:

Filtered air, oil, and fuel is essential to the life of the vehicle. Therefore, automotive technicians must know how to locate and when to change all vehicle filters.

III. PERFORMANCE OBJECTIVES:

Locate/replace air filter
Locate/replace fuel filter
Locate/replace oil filter
Locate/replace transmission filter
Locate/replace emission filters

IV. STUDENT LEARNING ACTIVITIES:

Using a live vehicle, student will demonstrate the location and replacement of air, fuel, oil, transmission and emission filters.

V. EVALUATIONS:

Filters are installed correctly using proper torque, according to manufacturer's directions.
Installed on a clean mounting surface.
Check for leaks.

VI. RESOURCES:

Student text and workbook
Appropriate shop manuals
Audio/visual aides on topic
Mock ups
Required special tools
Live vehicles

VII. SPECIAL NOTES:

Be sure that all necessary and appropriate safety precautions are observed to protect both the student and equipment from damage.

Student should compare old filters with new to ensure correct filter.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: A** **PERFORM SCHEDULED MAINTENANCE FUNCTIONS**

TASK: A-6 **Check Fluid Levels ***

II. INTRODUCTION:

Fluid levels are checked to prevent component damage due to low or empty fluids. Low fluids could also indicate a leak which could be a safety hazard.

III. PERFORMANCE OBJECTIVES:

Student will perform fluid checks on a vehicle using manufacturer's recommended procedures

IV. STUDENT LEARNING ACTIVITIES:

Using a live vehicle, shop manual and vehicle maintenance manual, student will demonstrate proper procedure to check fluid levels.

V. EVALUATIONS:

Fluid locations located.
Proper fluids used.
Filled to proper level using correct fluids.

VI. RESOURCES:

Textbook
Shop manuals
Owner's manual

VII. SPECIAL NOTES:

Fluid level checks include location, proper level and condition and filling as per factory specs.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS

TASK: A-7 Inspect Tire Pressure and Wear *

II. INTRODUCTION:

Tire maintenance is done to allow maximum tire mileage, safe tire conditions, and to provide the best ride and handling conditions.

III. PERFORMANCE OBJECTIVES:

Visually check tires for wear patterns
Check and adjust air pressure

IV. STUDENT LEARNING ACTIVITIES:

Instructor's lecture
Demonstration on tire wear and checking tire pressure

V. EVALUATIONS:

Given a vehicle, the student will check tire pressure with 100% accuracy.
Given a chart with different tire wear patterns, the student will identify the different wear patterns and their causes.

VI. RESOURCES:

Shop manuals
Textbook
Visual aids
Flip charts on tire wear
Video: "Wheels and Tires"

VII. SPECIAL NOTES:

TASK PERFORMANCE GUIDE

I. DUTY: A **PERFORM SCHEDULED MAINTENANCE FUNCTIONS**

TASK: A-8 **Change Tires, Rotate and Mount ***

II. INTRODUCTION:

Tire changes and rotations are required because of wear, cuts, leaks which can effect the handling and safety of the vehicle.

III. PERFORMANCE OBJECTIVES:

Mount and dismount a tire
Rotate tires on a vehicle

IV. STUDENT LEARNING ACTIVITIES:

After instruction and demonstration by instructor, student will demonstrate proper procedure to rotate and mount tires on a vehicle.

V. EVALUATIONS:

Student and instructor will determine the following:

- Proper safety procedures followed
- Valve stem inspected and replaced if necessary
- New tire checked for proper size
- Bead lube used
- Tire mounted using proper procedure
- Tire inflated to proper pressure
- Bead checked for leaks
- Wheel nuts installed, tightened using correct pattern and torque
- Tires rotated according to manufacturer's recommendations
- Wheel covers installed

VI. RESOURCES:

Tire Changer's Instruction Manual
Shop Manual
Owner's Manual

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS

TASK: A-9 Balance Tires *

II. INTRODUCTION:

To Be Developed

III. PERFORMANCE OBJECTIVES:

IV. STUDENT LEARNING ACTIVITIES:

V. EVALUATIONS:

VI. RESOURCES:

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS

TASK: A-10 Lubricate Hinges, Locks, and Weather Strips *

II. INTRODUCTION:

Failure to properly lubricate hinges, locks and weather strips will cause squeaks, wear, and locks to become inoperative. Poorly lubricated weather strips will allow air and water to leak by doors and windows.

III. PERFORMANCE OBJECTIVES:

Locate areas to be lubed
Determine lubricants needed
Apply lube to hinges, locks, and weather strips
Remove excessive lube

IV. STUDENT LEARNING ACTIVITIES:

Instructor's lecture
Demonstrate lubrication of hinges, locks and weather strips

V. EVALUATIONS:

Given a vehicle, the student will lube all hinges, locks, and weather strips as required by the manufacture using the correct type of lube and quantity.

VI. RESOURCES:

Shop manuals
Owner's manual
Lube chart

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS

TASK: A-11 Document Service Performed *

II. INTRODUCTION:

In order to keep records current, the automotive technician must maintain the service record for a given vehicle regarding the service performed, date, mileage, cost, technician and any other special information concerning the service.

III. PERFORMANCE OBJECTIVES:

The student will be able to record service data in the appropriate service records as required by the vehicle manufacturer, customer, school, and instructor

IV. STUDENT LEARNING ACTIVITIES:

Record service performed on work orders
Record service performed in vehicle owner's/service manual
Create letter of explanation of service performed to the customer

V. EVALUATIONS:

Given appropriate instruction and demonstration, the student will be able to accurately record all service performed on any vehicle in the appropriate documents in a clear and concise manner.

VI. RESOURCES:

Owner/Service manual
Work order
Demonstration example
Previous vehicle documentation

V. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS**

TASK: A-12 Check Vehicle Registration and Inspection Stickers *

II. INTRODUCTION:

To verify that a given vehicle has a valid and current registration and a valid and current inspection sticker, the automotive technician (as a service to the customer) will check and advise customer of status.

III. PERFORMANCE OBJECTIVES:

The student will be able to determine if a vehicle's registration and inspection sticker are current and valid.

The student will be able to correctly identify the expiration date of the registration and inspection sticker.

IV. STUDENT LEARNING ACTIVITIES:

Locate vehicle registration and inspection sticker
Check expiration date of registration
Verify vehicle registration plate number with registration
Verify VIN number of vehicle with registration
Check expiration date of the inspection sticker

V. EVALUATIONS:

Given appropriate instruction and demonstration, the student will be able to accurately determine if a given vehicle's registration and inspection sticker are current and valid.

VI. RESOURCES:

Vehicle with current and valid registration and inspection sticker
State Inspection Manual
Copies of current and expired registrations and inspection stickers

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS

TASK: A-13 Clean Vehicle Interior *

II. INTRODUCTION:

Interiors must be cleaned on a regular basis to reduce wear on vinyls, leather, carpet and clothe materials. This periodic cleaning will keep the interior of the vehicle in new condition which will produce a higher resale value.

III. PERFORMANCE OBJECTIVES:

The student will be able to clean and recondition vehicle interiors to meet industry standards and customer needs. Upon completion, the interior should appear as new as possible.

IV. STUDENT LEARNING ACTIVITIES:

Remove and vacuum floor mats
Vacuum carpets
Vacuum seats
Apply vinyl dressing to the dash and all other interior vinyl areas
Wash windows (inside and out)
Wash mirrors
Empty/clean ash trays

V. EVALUATIONS:

Given appropriate instruction and demonstration, the student will be able to clean and recondition the interior of a vehicle to a like-new condition.

VI. RESOURCES:

Auto Reconditioning Video
Auto Reconditioning Text

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: A — **PERFORM SCHEDULED MAINTENANCE FUNCTIONS**

TASK: A-14 Clean Vehicle Exterior *

II. INTRODUCTION:

An automotive technician must know how to clean, wash and dry the exterior of a vehicle to remove harmful materials and to restore the appearance to a like-new condition to increase resale and longevity of the vehicle.

III. PERFORMANCE OBJECTIVES:

The student will be able to clean and recondition exterior of a vehicle to meet industry standards and customer needs. Upon completion, the exterior of the vehicle should appear as new as possible.

IV. STUDENT LEARNING ACTIVITIES:

Rinse off loose dirt with water
Fill bucket with soap and water
Wash top, hood and trunk then rinse
Wash sides, front and rear then rinse
Clean tires and white walls with white wall cleaner and a scrub brush and rinse
Wipe vehicle dry with a soft clean towel
Wash windows and mirror glass

V. EVALUATIONS:

Given proper instruction and demonstration the student will be able to clean and recondition the exterior of a vehicle to a like-new condition.

VI. RESOURCES:

Auto Reconditioning Video
Auto Reconditioning Text

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: B CONDUCT EXHAUST SYSTEM FUNCTIONS

TASK: B-1 Diagnose Exhaust Conditions *

II. INTRODUCTION:

A visual inspection is necessary in order to determine the repairs or replacement parts needed to restore an exhaust system.

III. PERFORMANCE OBJECTIVE:

The student will be able to identify the problem area and determine if the defect can be repaired or if a component must be repaired.

IV. STUDENT LEARNING ACTIVITIES:

Raise and support the vehicle
With engine running, check the exhaust system for leaks
Check exhaust system for damage, rattles, loose connections, holes, rust, and missing components

V. EVALUATIONS:

Given appropriate instruction and demonstration, the student will be able to correctly determine the problem area of the exhaust system and the repairs or replacement components needed to correct the defect in a safe manner.

VI. RESOURCES:

Service Manual
Exhaust System Parts Book

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: B CONDUCT EXHAUST SYSTEM FUNCTIONS

TASK: B-2 Repair Defective Component *

II. INTRODUCTION:

So that a vehicle continues to run efficiently, the automotive technician must be able to make repairs and adjustments of defective exhaust system components to restore exhaust system to a safe operating condition.

III. PERFORMANCE OBJECTIVES:

The students will be able to make the proper repairs and adjustments to the defective exhaust system components.

IV. STUDENT LEARNING ACTIVITIES:

Raise and support vehicle
Secure loose components
Weld leaking components
With engine running, check repairs for leaks and rattles

V. EVALUATIONS:

Given appropriate instruction and demonstration, the student will be able to properly repair all exhaust system defects in a safe manner.

VI. RESOURCES:

Exhaust System Parts Book
Basic Gas and Electric Welding video and text

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: B CONDUCT EXHAUST SYSTEM FUNCTIONS

TASK: B-3 Replace Defective Components *

II. INTRODUCTION:

Replacement of defective exhaust components is vital for the safe operation of any motor vehicle.

III. PERFORMANCE OBJECTIVES:

Given a vehicle, the student will remove and replace the defective exhaust component(s), installing the new component(s) in the proper position, securely using the proper clamps, hangers, and flanges and then test for leaks and rattles.

IV. STUDENT LEARNING ACTIVITIES:

Instructor lecture/demonstration on using oxyacetylene torch and other tools used in exhaust work, use of parts catalogs, and demonstrate proper procedure of replacing exhaust components.

V. EVALUATIONS:

Instructors and student will check for the following:
    No leaks or rattles
    No loose components
    No mispositioned components
    No damage to other components in the system

VI. RESOURCES:

Shop manuals
Exhaust parts catalog
Parts store or dealer

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: B CONDUCT EXHAUST SYSTEM FUNCTIONS

TASK: B-4 Verify Repairs *

II. INTRODUCTION:

A visual inspection is necessary in order to determine that the system has been properly repaired. There should not be any leaks, rattles, or loose or mispositioned components.

III. PERFORMANCE OBJECTIVES:

The student will be able to inspect an exhaust system repair and verify that the repair is safe, done correctly, and meets industry and state inspection standards.

IV. STUDENT LEARNING ACTIVITIES:

Inspect exhaust system for proper clamps and hangers.
Inspect exhaust system for improper frame and body contact that could cause rattles.
Start vehicle and check for leaks around connections.
Road test and listen for leaks and rattles.

V. EVALUATIONS:

Given proper instruction and demonstration the student will be able to inspect an exhaust system repair and to verify that the repair has been done properly.

VI. RESOURCES:

Text book
State inspection manual
Class notes

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: C CONDUCT ENGINE COOLING SYSTEM FUNCTIONS**

TASK: C-1 Identify Cooling Systems/Components *

II. INTRODUCTION:

The cooling system is one of the more important systems on the automobile engine. If the cooling system is not operating properly, the engine can suffer severe damage. It is important to study coolant characteristics as well as various parts of the cooling system.

III. PERFORMANCE OBJECTIVES:

Identify purpose of the cooling system
Compare ways in which heat can be transferred
Compare operation and design of fans, shrouds, and belts
Define characteristics of coolant and antifreeze
Explain proper procedure to dispose of antifreeze
Describe operation of water pumps
State purpose and operation of thermostats and pressure caps
Explain operation and purpose of radiators

IV. STUDENT LEARNING ACTIVITIES:

Read text
Watch video
Given a cooling system diagram, identify the numbered components
Given a diagram, identify the type and percentage of heat loss from each of the numbered areas on the engine
Locate and identify various cooling system types and components on vehicles provided by the instructor

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will correctly answer 70% of the written test questions.
Assigned a vehicle, the student will correctly locate and identify 100% of the cooling system components listed by the instructor.

VI. RESOURCES:

Textbooks
Workbooks
Shop manuals
Repair manuals
Video tapes
Staff, student, and faculty vehicles

VII. SPECIAL NOTES:

When working with cooling systems REMEMBER:

- never remove the pressure cap when the engine is hot
- be careful not to touch hot engine parts
- never pour used antifreeze down any water drain
- keep hands and tools away from moving belts and spinning fans at all times

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: C CONDUCT ENGINE COOLING SYSTEM FUNCTIONS

TASK: C-2 Diagnose Cooling System *

II. INTRODUCTION:

An automotive technician must be able to locate and correct cooling system problems quickly and accurately. It is equally important to know how to maintain a cooling system in order to maintain the efficient operation of the vehicle.

III. PERFORMANCE OBJECTIVES:

List common cooling system problems and symptoms
Describe common causes of system leakage, overheating, and overcooling
Perform combustion leak and a system pressure test
Check major parts of a cooling system for proper operation

IV. STUDENT LEARNING ACTIVITIES:

Read text
Watch video
Perform a cooling system visual inspection on several vehicles provided by the instructor. Look for the following items:
  coolant leaks
  loose or missing belts
  low coolant level
  antifreeze protection
  shroud condition
  fan clutch operation
  abnormal water pump noise
  coolant leakage into oil
  combustion leakage into coolant
  radiator restricted air flow cooling system pressure test use a cooling system diagnosis chart

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will correctly answer 70% of the questions on a written test.
Assigned a vehicle, the student will perform a cooling system visual test, pressure test, and demonstrate the use of a diagnosis chart with 100% accuracy.

VI. RESOURCES:

Textbooks
Workbooks
Shop manuals
Repair manuals
Video tapes
Shop, faculty, student, and staff vehicles

VII. SPECIAL NOTES:

Stand behind, not over, the spinning fan blades.
DANGER: a fan with a cracked or bent blades is extremely dangerous! Broken blades can be thrown out causing death.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: C CONDUCT ENGINE COOLING SYSTEM FUNCTIONS

TASK: C-3 Service Cooling System *

II. INTRODUCTION:

The cooling system is a scheduled maintenance system. The student must be able to conduct this kind of routine service correctly.

III. PERFORMANCE OBJECTIVES:

Drain cooling system
Refill cooling system
Flush cooling system
Bleed cooling system
Refill cooling system
Obtain cooling system capacity using a shop manual

IV. STUDENT LEARNING ACTIVITIES:

Read chapter in text covering cooling systems, watch videos or film strips pertaining to cooling systems. Drain, flush, refill, and pressure check a cooling system.

V. EVALUATIONS:

Student will complete a test, covering textbook information.
Given instruction/demonstration, a student will be able to correctly drain, flush, refill, bleed, and pressure check a cooling system to manufacturer's specifications.

VI. RESOURCES:

Textbook, service manual, student tool box, reverse flush gun, antifreeze tester, pressure tester, thermostat gasket antifreeze, drain pan, hose clamp, pliers, training car.

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: C CONDUCT ENGINE COOLING SYSTEM FUNCTIONS

TASK: C-4 Repair Defective Components *

II. INTRODUCTION:

An automotive technician student must be able to repair basic cooling system components.

III. PERFORMANCE OBJECTIVES:

Because of the complexity of new cars, components are not usually repaired with the exception of the radiator. Radiator repair is a trade in itself and is beyond the scope of a Secondary Automotive Technician Vocational course.

IV. STUDENT LEARNING ACTIVITIES:

V. EVALUATIONS:

VI. RESOURCES:

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: C** **CONDUCT ENGINE COOLING SYSTEM FUNCTIONS**

TASK: C-5 **Replace Defective Component(s) ***

II. INTRODUCTION:

Following the identification of a defective component, the component must be replaced using the procedure recommended by the vehicle manufacturer.

III. PERFORMANCE OBJECTIVES:

The student will be able to research component replacement proceudurs, select the proper tools and equipment, and replace a defective component.

IV. STUDENT LEARNING ACTIVITIES:

Locate defective component on the vehicle.
Research replacement procedure.
Select proper tools and equipment.
Locate replacement component.
Remove defective component per instructions.
Install replacement component per instructions.
Verify repair.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to properly replace a defective cooling system component. After the repair is complete all cooling system functions should operate properly, the engine should operate at the proper temperature, and the cooling system should be free of any leaks.

VI. RESOURCES:

Service manual
Text book
Equipment instructions
Class notes

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: C CONDUCT ENGINE COOLING SYSTEM FUNCTIONS**

TASK: C-6 Verify Repairs *

II. INTRODUCTION:

When a cooling system repair is done the repair needs to be tested to see if it eliminated the vehicle problem and that the system operates properly and is free of any leaks.

III. PERFORMANCE OBJECTIVES:

The student will be able to verify that the cooling system repair performed eliminated the vehicle problem that was diagnosed, that the system is free of any leaks, and that all cooling system sub-systems operate properly.

IV. STUDENT LEARNING ACTIVITIES:

Start the vehicle and bring to operating temperature.
Check for coolant leaks at hose connections and at the repair area.
Operate all sub-systems, heater, defroster, and air-conditioner to verify proper operation.
Verify that the engine is operating at the manufacturers specified temperature.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to accurately verify that a cooling system repair has been done properly and that the vehicle's cooling system problem has been eliminated as a result of the repair.

VI. RESOURCES:

Service manual
Text book
Equipment instructions
Class notes

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: D CONDUCT BRAKE SYSTEM FUNCTIONS**

TASK: D-1 Identify Brake System *

II. INTRODUCTION:

Proper identification is an important part of proper brake system diagnosis and repair. It is also a very important part of researching, diagnosing, and repair procedures.

III. PERFORMANCE OBJECTIVES:

The student will be able to identify the type of brake system, disc or drum, manual or power, and anti-lock.

IV. STUDENT LEARNING ACTIVITIES:

Remove the tires and determine if the vehicle has disc or drum brakes,
Locate the master cylinder and determine if the vehicle has manual or power brakes.
Locate the master cylinder and determine if the vehicle is equipped with anti-lock brakes.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to accurately accurately identify the type of brake system on any given vehicle.

VI. RESOURCES:

Text book
Brake system video
Service manual
Class notes

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: D CONDUCT BRAKE SYSTEM FUNCTIONS

TASK: D-2 Diagnose System Condition *

II. INTRODUCTION:

To properly repair a brake system problem it is very important to isolate the problem area by properly assessing overall brake system conditions.

III. PERFORMANCE OBJECTIVES:

The student will be able to assess brake system condition by gathering information from the vehicle owner, road test, and by inspection of brake system components.

IV. STUDENT LEARNING ACTIVITIES:

Verify customer complaint through road testing the vehicle.
Check brake fluid level at the master cylinder.
Check for leaks at wheel cylinders, calipers, master cylinder, brake lines, brake hoses, and all connections.
Check for brake pad and rotor condition.
Check for brake shoe and drum condition.
Check for proper emergency brake operation.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to accurately accurately identify overall brake system condition as well as isolate problem areas. The student will be able to recommend repairs and identify components that need replacement.

VI. RESOURCES:

Text book
Service manual
Brake system video
Class notes

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: D CONDUCT BRAKE SYSTEM FUNCTIONS

TASK: D-3 Perform Mechanical Function Check *

II. INTRODUCTION:

A brake system has several sub-systems. To properly diagnose and repair the overall brake system, each of the sub-systems must be tested in order to isolate the problem area.

III. PERFORMANCE OBJECTIVES:

The student will be able to inspect the overall brake system as well as it's sub-systems for proper mechanical operation.

IV. STUDENT LEARNING ACTIVITIES:

Test all wheels for proper brake operation.
Test the hydraulic system for proper operation and for leaks.
Test the emergency brake system in forward and reverse.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to accurately test the brake system components for proper mechanical operation.

VI. RESOURCES:

Text book
Service manual
Class notes
Brake system video

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: D CONDUCT BRAKE SYSTEM FUNCTIONS**

TASK: D-4 Perform Vacuum System Check *

II. INTRODUCTION:

Identify vacuum components for proper repair and testing.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

- Test vacuum components as outlined in repair manual for repairing and replacing
- Verify the repair

IV. STUDENT LEARNING ACTIVITIES:

Explain system in classroom using textbook and overhead diagrams
Demonstrate test procedure on live car using proper tools and repair manuals
Demonstrate proper way to verify repair

V. EVALUATIONS:

Test questions from textbook
Student will demonstrate knowledge by performing test and repair on live car
Verbal quizzing student

VI. RESOURCES:

Repair manual
Video
Overhead transparency
Live car

VII. SPECIAL NOTES:

Verbal questioning before and after exercise
Watch for proper test procedures and manual use
Watch for safe work habits

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: D CONDUCT BRAKE SYSTEM FUNCTIONS

TASK: D-5 Perform Electrical Function Check

II. INTRODUCTION:

Perform electrical function check on all electrical components related to the brake system.

III. PERFORMANCE OBJECTIVES:

The student will demonstrate the ability to identify the electrical component with help of service manual.
The student will check and test components as outlined in repair manual.
The student will demonstrate the proper use of a D.V.O.M.

IV. STUDENT LEARNING ACTIVITIES:

Explain systems in classroom using textbook and videos
Demonstrate systems operation with mock-up and live care
Demonstrate and explain how to use a D.V.O.M.

V. EVALUATIONS:

Test questions from textbook
Oral questioning on system operation
Have student demonstrate system operation with live car
Have student demonstrate proper use of D.V.O.M.

VI. RESOURCES:

Textbook
Video
Mock-up
Live work
Repair manuals

VII. SPECIAL NOTES:

Safe system handling, watch for proper procedure
Follow-up questions
Guest speaker who specializes in electrical repair

VII. SPECIAL NOTES: (continued)

Take time to familiarize the students with the use of a Digital Voltage Ohm Meter (D.V.O.M.)

Use batteries and test stations in classroom

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: D CONDUCT BRAKE SYSTEM FUNCTIONS

TASK: D-6 Perform Hydraulic System Check *

II. INTRODUCTION:

The hydraulic system will be checked for safe and proper functioning, leaks, and contamination.

III. PERFORMANCE OBJECTIVES:

The student will identify the systems and components using charts and manuals.
The student will test the operation of the system.
The student will visually check the system for leaks.

IV. STUDENT LEARNING ACTIVITIES:

Explain system operation in classroom with text, videos, and overheads
Demonstrate use of pressure gauges
Have samples of good and bad fluid for students to compare

V. EVALUATIONS:

Test questions
Oral quizzing
Hands on system check by student while being observed

VI. RESOURCES:

Textbook
Repair manuals
Videos
Tool instructional use manuals
Mock-ups
Live work

VII. SPECIAL NOTES:

Stress the safety factor when working around hydraulics
Stress the importance of proper system check on brakes
Point out what could happen to customers, if improperly done
Stress the importance of brakes to the car

VII. SPECIAL NOTES: (continued)

Use manuals and videos to show difference in systems
Use colored charts showing fluid flow to components

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: D CONDUCT BRAKE SYSTEM FUNCTIONS**

TASK: D-7 Repair Parts *

II. **INTRODUCTION:**

This task involves repairing defective parts of the brake system. Reference to service manuals must be used as there are many different types of brake systems on the market.

III. **PERFORMANCE OBJECTIVES:**

Disassemble brake components
Repair defective parts
Check components are repaired correctly
Follow safety precautions

IV. **STUDENT LEARNING ACTIVITIES:**

Read text on repairing components
Practice repairs on shop modules
Class discussion
Identify and use appropriate hand tools

V. **EVALUATIONS:**

Students will be able to discuss types of repairs, repair components, and test components to manufacturer's specifications.
Students will be able to pass written test with 80% accuracy **AND DO REPAIRS WITH 100% ACCURACY.**

VI. **RESOURCES:**

Automotive text
Manufacturer's text
Video tapes
Shop modules
Job sheets
Class discussion

VII. SPECIAL NOTES:

Training in asbestos removal is needed. Some brake systems operate at a very high pressure and need safety precautions when disassembling and reassembling. Repairing of brake components require training in use of special tools.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: D CONDUCT BRAKE SYSTEM FUNCTIONS**

TASK: D-8 Replace Parts *

II. INTRODUCTION:

As parts of the brake system wear out, it will become necessary to replace those parts. Use of service and shop manuals must be used as there are many different types of brake systems on the market.

III. PERFORMANCE OBJECTIVES:

Disassemble brake components
Replace defective components
Test and adjust replaced components
Follow manufacturer's specifications
Use appropriate hand tools

IV. STUDENT LEARNING ACTIVITIES:

Read text on replacing brake components
Practice replacing components on shop modules
Class discussion
Use appropriate hand tools

V. EVALUATIONS:

Students will be able to discuss parts replacement procedures and pass a written test with 80% accuracy.
Replace parts with 100% accuracy using manufacturer's specifications.

VI. RESOURCES:

Automotive text
Manufacturer's text
Shop manuals
Shop modules
Job sheets
Class discussion

VII. SPECIAL NOTES:

Training in asbestos removal is needed. Some brake systems operate at very high pressure and safety precautions must be used. Use of safety equipment and training in use of special tools for brakes is also needed.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: D CONDUCT BRAKE SYSTEM FUNCTIONS

TASK: D-9 Verify Repairs *

II. INTRODUCTION:

Verification and recordkeeping of repairs must be maintained. Mileage and other important information must be recorded for warranty or customer service records.

III. PERFORMANCE OBJECTIVES:

Visually inspect system for leaks
Pressure check pedals
Road test vehicle for proper system operation
Record repairs
Use checklist for inspection

IV. STUDENT LEARNING ACTIVITIES:

Visual inspections
Road test vehicle for proper system operation
Record repairs

V. EVALUATIONS:

Accurate recordkeeping
Use checklist for visual inspection
Vehicle meets all manufacturer's specifications

VI. RESOURCES:

Shop modules
Repair orders
Stopping distance chart
Checklist

VII. SPECIAL NOTES:

Use safety equipment when checking vehicle.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: E CONDUCT BODY COMPONENT FUNCTIONS

TASK: E-1 Identify Chassis/Body Components *

II. INTRODUCTION:

Chassis or body components may require adjustment or repair after other mechanical repairs or as a part of a new car set-up, collision, or warranty. Most of these repairs will be done by an Autobody Technician, howevr it may be the job of the Mechanical Technician to determine the problem and to recommend the proper repair Technician. The first step to this process is the proper identification of these components.

III. PERFORMANCE OBJECTIVE:

The student will be able to locate and identify the chassis or body components of a vehicle.

IV. STUDENT LEARNING ACTIVITIES:

Identify all the chassis/body components by material. Glass, plastic, rubber, and metal.
Identify components by their location on the vehicle.
Determine how the components are attached. Welded, bolted, rivited, or glued.
Determine if a component can be adjusted.
Determine if a component should be serviced by a Mechanical Technician or an Autobody Technician.
Research repair or replacement procedures for these components.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to accurately identify the chassis/body components of a vehicle, repair or replacement procedures, and proper personal to do these procedures.

VI. RESOURCES:

Text Book
Service Manual
Autobody Text Book
Class Notes

VII. SPECIAL NOTES:

It is very important that proper instruction be given in the area of what should be a "Mechanical Repair" and what should be a "Autobody Repair."

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: E CONDUCT BODY COMPONENT FUNCTIONS**

TASK: E-2 Diagnose Chassis/Body Components

II. INTRODUCTION:

To determine the proper repair procedure and an accurate diagnosis of a defective chassis/body component is needed.

III. PERFORMANCE OBJECTIVES:

The student will be able to determine a defective chassis/body component or area from customer information and testing. The student will also be able to research the repair procedure and recommend the proper repair personnel.

IV. STUDENT LEARNING ACTIVITIES:

Receive a description of the problem.
Research a test procedure for the problem.
Test the problem area.
Determine proper repair procedure and personnel.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to accurately diagnose chassis/body problem areas and components and determine repair procedures and as well as who should perform the repair an Autobody Technician or a Mechanical Technician.

VI. RESOURCES:

Text Book
Service Manual
Autobody Text Book
Class Notes

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: E CONDUCT BODY COMPONENT FUNCTIONS

TASK: E-3 Check, Wind, Noise, and Vibrations

II. INTRODUCTION:

A common problem with new as well as old vehicles is unusual noises. The first step towards repair of these problems is to isolate the cause of the noise. Some of the more common causes are wind and vibration. These causes can be verified by a customer complaint and a road test.

III. PERFORMANCE OBJECTIVES:

The student will be able to identify unusual noises through various testing procedures.

IV. STUDENT LEARNING ACTIVITIES:

Review customer complaint.
Road test the vehicle.
Isolate the problem area.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to accurately isolate vehicle noises and determine that the noise is from wind leaking into the passenger compartment or if there is a mechanical problem causing a vibration that creates a noise.

VI. RESOURCES:

Text Book
Service Manual
Autobody Text Book
Class Notes

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: E CONDUCT BODY COMPONENT FUNCTIONS

TASK: E-4 Conduct Visual Check (sheet metal, fixed glass, windows, door locks)

II. INTRODUCTION:

A visual check of the body alignment, fixed glass condition and seal windows operation, and door lock operation will be done and check for proper door closure.

III. PERFORMANCE OBJECTIVES:

The student will look for fender to door alignment, hood alignment, and trunk alignment.
The student will inspect the weather seal around any stationary glass.
The student will check the operation and seal of all movable glass.
The student will operate and check door locks and door operations.

IV. STUDENT LEARNING ACTIVITIES:

Take students on tour of parking lot to show them the different body lines and glass type
Use different model cars to demonstrate the variation in lock systems
Discuss the styles

V. EVALUATIONS:

Written and verbal questions
Have students identify the systems on their cars when doing other jobs on the car
Have students aligning doors and hoods on mock-up

VI. RESOURCES:

Various cars in shop and parking lot
Repair manuals
Diagrams and pictures of cars

VII. SPECIAL NOTES:

Explain and show through mock-ups electric door locks and the basic operation
Explain what can happen with improper alignment of doors and trunks

VII. SPECIAL NOTES: (continued)

Cover wind noises caused by improper window or door alignment
Demonstrate water leaks using mock-ups and water hose

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: E CONDUCT BODY COMPONENT FUNCTIONS

TASK: E-5 Inspect for Water Leakage *

II. INTRODUCTION:

A visual inspection of the trunk and interior floor mats will be made, to look for water stains or wet mat/carpets.

III. PERFORMANCE OBJECTIVES:

The student will look for signs of water leaks through out the car
The student will look for wet carpets.
The student will look for rust spots.

IV. STUDENT LEARNING ACTIVITIES:

Cause water leaks on mock-ups and have student identify
Demonstrate repair procedure

V. EVALUATIONS:

Question students
Have students demonstrate repair technique

VI. RESOURCES:

Mock-ups
Body charts

VII. SPECIAL NOTES:

When water leaks come into shop use for small group demonstration of repair

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: E CONDUCT BODY COMPONENT FUNCTIONS

TASK: E-6 Adjust Lighting *

II. INTRODUCTION:

Proper head light adjustment is important for safety and a state inspection sticker.

III. PERFORMANCE OBJECTIVES:

The student will check and adjust headlight angles to state specifications.

IV. STUDENT LEARNING ACTIVITIES:

Play video in classroom on how to properly use headlight aiming tools
Explain different methods of checking alignment

V. EVALUATIONS:

Test questions
Verbal testing
Aligning vehicle headlights

VI. RESOURCES:

Test equipment
Instructional video and book
Repair manual

VII. SPECIAL NOTES:

Stress safety of proper headlight alignment to both driver and oncoming car

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: E CONDUCT BODY COMPONENT FUNCTIONS

TASK: E-7 Adjust Body Fits

II. INTRODUCTION:

Some body components are designed to be adjustable in order to compensate for slight mis-alignments in fit. These adjustments can be made by following the proper procedures and with the correct tools and equipment.

III. PERFORMANCE OBJECTIVES:

The student will be able to determine if a chassis/body component is adjustable.
The student will be able to research the adjustment procedure and then make the proper adjustments.

IV. STUDENT LEARNING ACTIVITIES:

Identify adjustments needed.
Research adjustment procedures.
Make adjustments.
Verify repairs.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to accurately adjust body components in a manner that will eliminate the problem that was caused by the defective component.

VI. RESOURCES:

Text Book
Service Manual
Autobody Text Book
Class Notes
Equipment Instructions

VII. SPECIAL NOTES:

The vehicle may have damage that will not allow adjustment of body components to cure a problem. This should be taken into consideration in the student evaluation.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: E CONDUCT BODY COMPONENT FUNCTIONS

TASK: E-8 Repair Defective Components

II. INTRODUCTION:

Body components can be very expensive to replace. It is often more economical to repair a unit rather than replace it. The decision should be made on what will be the best service and value for the customer.

III. PERFORMANCE OBJECTIVES:

The student will be able to determine if a body component can be repaired and if so research the repair procedure, tools and equipment to perform the repair, repair the defective componentl, and verify the repair.

IV. STUDENT LEARNING ACTIVITIES:

Identify defective component.
Determine if it is an automechanical or an autobody procedure.
Research repair procedure.
Determine tools and equipment needed.
Perform the repair.
Verify repair.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to make the determination if a repair is the correct procedure, and repair the component to a like new condition.

VI. RESOURCES:

Text Book
Service Manual
Autobody Text Book
Class Notes
Equipment Instructions

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: E CONDUCT BODY COMPONENT FUNCTIONS

TASK: E-9 Replace Defective Components

II. INTRODUCTION:

Replacement of body components should be made after the decision has been made that repair of the body component is not the best value for the customer.

III. PERFORMANCE OBJECTIVES:

The student will be able to determine if a body component should be replaced rather than repaired.

The student will be able to research the replacement procedure, identify tools and equipment needed for replacement, replace the defective component, and verify the repair.

IV. STUDENT LEARNING ACTIVITIES:

Identify the defective component.
Determine if the procedure is automechanical or autobody.
Locate replacement body component.
Research replacement procedure.
Determine tools and equipment needed for the replacement.
Replace the defective component.
Verify the repair.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to replace a defective body component and restore the problem area to a like new condition.

VI. RESOURCES:

Text Book
Service Manual
Autobody Text Book
Class Notes
Equipment Instructions

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: E CONDUCT BODY COMPONENT FUNCTIONS**

TASK: E-10 Verify Repairs *

II. INTRODUCTION:

To ensure customer satisfaction and quality work all chassis/body repairs should be tested and verified that the repair has corrected the problem and has restored the problem area to a like new condition.

III. PERFORMANCE OBJECTIVES:

The student will be able to test chassis/body repairs. This will determine if the repair was done properly and has corrected the problem.

IV. STUDENT LEARNING ACTIVITIES:

Determine the repair that was made.
Research the original problem or complaint.
Test the repair using the appropriate testing procedure.
Note any defects in the final product relating to the repair.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to accurately test and verify that the chassis/body repair has been done properly.

VI. RESOURCES:

Text Book
Service Manual
Autobody Textbook
Class Notes

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: F CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS

TASK: F-1 Identify Steering/Systems *

II. INTRODUCTION:

Before a technician can repair a problem or service a steering/suspension system he/she must be able to accurately and efficiently be able to identify all major components of the two systems.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Locate and identify the front suspension system and individual components
Locate and identify the rear suspension system and individual components
Locate and identify the manual suspension system and individual components
Locate and identify the power suspension system and individual components

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to identify all Suspension System parts including: front suspension and rear suspension.

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to identify all Steering System parts.

V. EVALUATIONS:

Upon completion of this task sheet a student will be able to locate and describe, either orally or in writing, all major components of an automobile suspension or steering system as specified by an appropriate repair publication with 80% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive textbooks and repair manuals.
Live automobiles or an accurate mock-up representation of steering and suspension systems.

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: F CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS

TASK: F-2 Identify Problem Area/Type *

II. INTRODUCTION:

Identification of the problem area in a steering/suspension system can assist the technician in determining the exact location and cause of a faulty component, therefore saving time and money.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

- Review customer repair order for complaint
- Operate vehicle in order to confirm complaint
- Visually inspect suspension/steering systems
- Using procedures outlined in appropriate repair manual, perform checks for loose ball joints, loose inner and outer tie rod ends, and ride height and compare to factory specifications.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate all basic faults inherent in a Suspension System.

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate all basic faults inherent in a Steering System.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate all basic types of faults in the major components of an automobile suspension or steering system with 80% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive textbooks and repair manuals
Live automobiles or an accurate mock-up representation of steering and suspension systems

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: F CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS

TASK: F-3 Perform Visual System Check *

II. INTRODUCTION:

A visual check is a skill which every professional technician uses in order to quickly identify major mechanical failures in a steering/suspension system. The technician must be familiar with many types of steering/suspension systems and know the difference between normal and abnormal wear on all components.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Identify the type of steering/suspension system
Visually inspect all rubber bellows and boots for damage
Visually inspect for rust and accident damage
Visually inspect for leaks in the suspension or steering components
Visually inspect suspension and steering for broken, bent, or worn components

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to visually inspect and identify both the type of suspension system and possible problems.

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to visually inspect and identify both the type of steering system and possible problems.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate visually inspect and identify both the type of steering system and possible problems with 80% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive textbooks and repair manuals
Live automobiles or an accurate mock-up representation of steering and suspension systems.

VII. SPECIAL NOTES:

TASK PERFORMANCE GUIDE

I. DUTY: F CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS

TASK: F-4 Diagnose Steering System

II. INTRODUCTION:

In order to correctly diagnose a vehicles steering system, for worn components or components in need of adjustments, a student must first obtain a strong foundation regarding steering system principles of operation.

III. PERFORMANCE OBJECTIVES:

Upon completion of this task, students will be able to verify and diagnose complaints.

IV. STUDENT LEARNING ACTIVITIES:

Read and discuss steering system diagnosis
View and discuss steering system diagnosis
Provide students with an inventory of defective/worn components
Provide students with a mock up RE: steering system diagnosis
Provide students with live outside work

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will be able to diagnose steering systems with a degree of competence.

VI. RESOURCES:

Steering/suspension text books
Steering/suspension films
Worn/defective component inventory (local garages)
Publics contribution of live work

VII. SPECIAL NOTES:

Statistics support the need of routine steering/suspension diagnosis/inspection.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: F CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS

TASK: F-5 Diagnose Suspension System

II. INTRODUCTION:

In order to correctly diagnose a vehicles suspension system for worn components or components in need of adjustment, a student must first obtain a strong foundation regarding suspension system principles of operation.

III. PERFORMANCE OBJECTIVES:

Upon completion of this task, students will be able to verify and diagnose complaints.

IV. STUDENT LEARNING ACTIVITIES:

Read and discuss suspension system diagnose
View and discuss suspension system diagnose
Provide students with an inventory of defective/worn components
Provide students with a mock up, RE: suspension system diagnosis
Provide students with the diagnosis of live work

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will be able to diagnose suspension systems with a degree of competence.

VI. RESOURCES:

Steering/suspension text books
Steering/suspension films
Worn/defective components inventory (local garages)
Public's contribution of live work

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: F** **CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS**

TASK: F-6 **Repair Defective Components**

II. INTRODUCTION:

In order to correctly be able to remove, repair, and reinstall components of the steering and suspension systems, due to the liability of the systems at hand a student must be able to make the decision to repair or replace the component(s).

III. PERFORMANCE OBJECTIVES:

Upon completion of this task, students will be able to repair defective components.

IV. STUDENT LEARNING ACTIVITIES:

Read and discuss steering and suspenison repair information
View and discuss steering and suspension repair films
Provide students with an inventory of defective components as learning aids
Provide students with live work RE: repair of systems

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will be able to perform repairs with a degree of confidence.

VI. RESOURCES:

Steering/suspension textbooks
Steering/suspension films
Worn/defective components inventory (local garages)
Public contribution of live work

VII. SPECIAL NOTES

Due to the enormous liability at hand, students should be informed that all repairs, beyond the shadow of a doubt, be made with a high degree of integrity.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: F** **CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS**

TASK: F-7 **Replace Defective Component ***

II. INTRODUCTION:

After careful diagnosis of a steering and suspension system, all worn, bent, cracked or otherwise defective components must be replaced in order to assure the safe and proper operation of those systems.

III. PERFORMANCE OBJECTIVES:

Follow shop manual replacement procedures
Identify special tools required
Use special tools properly and safely
Utilize personal and safety precautions
Remove and replace defective part

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate shop manual usage.
Demonstrate the safe and proper use of special tools i.e. spring compressor, ball joint tools, drivers. etc.
Using live vehicles, remove and install a variety of steering and suspension parts using shop manuals, special tools, safe and proper procedure.

V. EVALUATIONS:

Written testing on:
  shop manual usage
  special tool identification
  proper removal and installation procedures
  all related safety precautions
Student removes and installs steering and suspension parts.
Evaluate student performance on:
  following all safety precautions
  using shop manual and suggested procedures
  removing defective part and installing new part

VI. RESOURCES:

Student text and workbook
Appropriate shop manuals
Audio/visual aides on topic
Mock ups
Required special tools
Live vehicles

VII. SPECIAL NOTES:

Be sure that all necessary and appropriate safety precautions are observed to protect both the student and equipment from damage.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: F CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS

TASK: F-8 Perform Alignment

II. INTRODUCTION:

In order to assure good responsive handling, smooth ride, and good tire wear, it is important that an alignment be performed to verify that vehicle's steering and suspension systems are set to factory specifications.

III. PERFORMANCE OBJECTIVES:

Inspect steering and suspension parts for excessive wear prior to alignment set up
Set car onto alignment machine
Install alignment equipment onto vehicle
Calibrate equipment to vehicle
Read out current alignment settings and compare to factory specifications
Make adjustments to caster, camber and toe settings to agree to factory specifications
Remove vehicle from alignment machine
Road test vehicle to verify repair

IV. STUDENT LEARNING ACTIVITIES:

Explain and demonstrate theoretical concepts pertaining to caster, camber, toe and tracking.
Demonstrate method for testing steering and suspension components for wear.
Cover all aspects of the alignment machine being used i.e. operation, mounting wheel heads, reading screens etc. and all safety precautions.
Put a live vehicle on the alignment machine and demonstrate machine set up.
Demonstrate proper method and tool use for aligning the type vehicle being aligned.
Road test vehicle with student. Demonstrate what "good handling" is and compare it to actual handling conditions of the vehicle being tested.

V. EVALUATIONS:

Written testing on all classroom theory materials.
Observe student checking all steering and suspension parts for wear.
Verbally quiz student during inspection.
Observe student setting up a vehicle on the alignment machine.

V. EVALUATIONS: (continued)

Observe student making all necessary adjustments. Verbally quiz student during the procedure.

Road test vehicle and evaluate students interpretation of actual handling characteristics.

VI. RESOURCES:

Student text and workbook
Alignment machine training and use manual
Factory/shop manuals for specifications
Factory Technical Service Bulletins
Vehicles with various types of steering and suspension systems

VII. SPECIAL NOTES:

Be certain that all necessary and appropriate safety precautions are observed to protect the student and equipment from damage.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: F CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS

TASK: F-9 Verify Repairs

II. INTRODUCTION:

After making any repair or adjustment to the steering or suspension system, it is critical that an evaluation of the results of the repairs be made. The vehicle must be road tested to ensure that the customer's initial complaint is corrected and the vehicle's handling characteristics are correct.

III. PERFORMANCE OBJECTIVES:

Review customer's complaint
Review corrective measures
Road test vehicle under the same conditions customer noticed problem (if applicable)
Check pulling, centered steering wheel, proper return from right and left turns, and vibrations
Evaluate overall handling characteristics

IV. STUDENT LEARNING ACTIVITIES:

Verbally review complaints and repairs with the student.
Road test vehicle with the student and explain the reasons for performing the following tests:
  Verify the absence of customer's complaint.
  Test for pulling, centered steering wheel, proper returns and vibrations.
  Explain what "proper handling characteristics" are and demonstrate them to the student.

V. EVALUATIONS:

Ride with the licensed student as an observer
Have student verbally describe procedures being used to evaluate repairs
Note all comments as to proper operation
Road test vehicle yourself and compare findings

VI. RESOURCES:

Student text and workbook
Repair order with "complaint" and "repairs" made
Repaired vehicle

VII. SPECIAL NOTES:

Instructor must be the vehicle operator for unlicensed students.

Be certain all necessary and appropriate safety precautions are observed to protect the student and equipment from damage.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G **CONDUCT ELECTRICAL SYSTEM FUNCTIONS**

TASK: G-1 **Identify Electrical Systems** *

II. INTRODUCTION:

Identifying individual electrical systems, their components and correct operation is critical to the ability to diagnose and repair these systems.

III. PERFORMANCE OBJECTIVES:

Identify individual electrical systems in vehicle i.e. charging, lighting, etc
Know physical location of system components
Know general location and routing of system wiring
Understand individual system purpose and operation

IV. STUDENT LEARNING ACTIVITIES:

Create general listing of all electrical systems found in an average, modern vehicle
Isolate each system and list typical components related to them
Using schematic drawings, demonstrate general location of each component
Show general location of connecting circuitry
Describe function of each system listed
Demonstrate location and physical appearance of listed electrical components on a vehicle
Demonstrate operation of each system

V. EVALUATIONS:

Complete written quiz on:
  Typical electrical systems found in a vehicle
  Basic components in each system
  General location of each system components
  Basic functions of each system
Student hands-on demonstration of electrical systems component location on a live vehicle.
Student verbally and/or physically demonstrate proper operation of each system.

VI. RESOURCES:

Student text and workbooks
Factory and/or after-market shop manuals

VI. RESOURCES: (continued)

Live vehicle
Various training graphics/materials, i.e. mock ups, etc.

VII. SPECIAL NOTES:

Be sure that all necessary and appropriate safety precautions are observed to protect the student and equipment from damage.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-2 Identify Problem Area

II. INTRODUCTION:

Specific problem area identification is a critical task in that, without this ability, it would be impossible for an automotive technician to make a correct repair.

III. PERFORMANCE OBJECTIVES:

Utilize electrical test equipment
Understand purpose and function of specific electrical components
Decode and follow electrical circuit schematics
Use test equipment
Conduct circuit and component testing
Isolate specific electrical system problems i.e. shorts, grounds, opens in wiring and components

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate functions and uses of digital and analog multimeters, short testers, test light.
Using mock ups, give students hands-on experience in use of test equipment.
Have students look up specific resistance, voltage, amperage draw values for components such as blower motor, alternator, etc.
Using appropriate wiring diagrams, have students decode wire color, gauge, and location.
Trace complete circuit from battery positive through all components and back to ground.
Identify connector locations.
Decode component designations.
Teach systematic approach to system analysis i.e. verify complaint, visual check, fuse condition, etc. using a live vehicle.

V. EVALUATIONS:

Observe students use and understanding of test equipment.
Using shop manuals, ask for specific circuit and component values (written or verbal).

V. EVALUATIONS: (continued)

Measure student understanding of wiring schematics via written exam.
Observe student in actual hands-on diagnostic situation using a live vehicle or appropriate mock-up.

VI. RESOURCES:

Student text and workbooks
Factory/after market shop manuals
Various electrical and electronic test equipment
Wiring and circuit schematics
Mock up circuits and components
Appropriate audio/visual aides
Live vehicle

VII. SPECIAL NOTES:

Be sure that all necessary and appropriate safety precautions are observed to protect both the student and equipment from damage.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-3 Perform Visual Check *

II. INTRODUCTION:

Prior to any actual attempt to repair an electrical system, a careful visual check should be made. Many times seemingly in-depth problems are actually the result of a relatively minor and fairly obvious problem such as loose or corroded ground connection; disconnected harness plug; loose drive belt, etc.

III. PERFORMANCE OBJECTIVES:

Identify individual components of electrical system
Operating characteristics (sounds, vibration, appearance, temperature, output, etc.) of individual components
Perform visual inspection of an electrical system using a logical sequence routine

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate individual electrical components.
Using live vehicle, demonstrate location, purpose, function, and what "normal operation" is.
Demonstrate what is included in a visual check.
Have student read the text pertaining to electrical repairs and do the related workbook activities.
Utilize all audio/visual materials pertaining to the subject matter.
Have student make an actual "Visual check" of components in a particular system.

V. EVALUATIONS:

Written testing on all classroom activities.
Observe student making visual check of components on an appropriately bugged vehicle and analyze student's evaluation.

VI. RESOURCES:

Student text and workbook
Appropriate shop manuals
Live vehicle
Mock ups
Audio/visual aides

VII. SPECIAL NOTES:

Be sure that all necessary and appropriate safety precautions are observed to protect both the student and equipment from damage.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-4 Analyze Charging System

II. INTRODUCTION:

The proper operation of the charging system is critical to trouble-free performance of all the electrical systems on board a vehicle. By utilizing specific tests and checks, the technician can verify the condition of the charging system.

III. PERFORMANCE OBJECTIVES:

Know location of all charging system components
Know function of each component
Obtain working knowledge of all necessary and appropriate test equipment
Perform complete visual check of charging system
Test battery i.e. hydrometer, green eye, voltage test, load test
Use and interpret information contained in shop manuals
Connect meters to charging system and analyze the readings
Isolate voltage regulator from alternator for testing

IV. STUDENT LEARNING ACTIVITIES:

Using live vehicle, demonstrate location of all charging system components.
Demonstrate use of digital and analog volt-ohm-amp-meter.
Demonstrate use of hydrometer and carbon pile load tester on a battery.
Have student use shop manual to determine charging system specifications and testing procedures for a live vehicle.
Demonstrate procedure for connecting up the appropriate testing equipment to a live vehicle.
Explain meaning of the readings obtained from testing.

V. EVALUATIONS:

Question student orally as to exact location of specific charging system components.
Observe student demonstrating ability to use testing equipment.
Check student's shop manual findings against shop manual.
Observe student making all necessary test equipment connections.
Observe the student analyzing charging system.
Orally question student as test results present themselves pertaining to relevance and meaning.

VI. RESOURCES:

Student text and workbooks
Test equipment operating manuals
Appropriate shop manuals
Audio/visual aides
Live vehicle
Appropriate testing equipment

VII. SPECIAL NOTES:

Be sure that all necessary and appropriate safety precautions are observed to protect both the student and equipment from damage.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-5 Analyze Starting System

II. INTRODUCTION:

The starting system is an electrical circuit that converts electrical energy to mechanical energy. A student will study this area to be able to identify a starting system malfunction.

III. PERFORMANCE OBJECTIVES:

Conduct voltage drop
Locate and identify components
Use DVOM
Use battery load tester
Read wiring diagrams

IV. STUDENT LEARNING ACTIVITIES:

Given proper instruction and demonstration, the student will be able to analyze a starting system on a vehicle to determine if it is functioning properly.

V. EVALUATIONS:

Given proper instruction and/or demonstrations, the student will pass a written test with 80% accuracy and analyze a starting system with 100% accuracy.

VI. RESOURCES:

Live care or mock-up
Wire diagrams
DVOM
Battery load tester
Repair manuals
Instructor
Proper hand tools

VII. SPECIAL NOTES:

Student will have passed the shop safety test and be able to identify dangers involved.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-5 Analyze Starting System

II. INTRODUCTION:

III. PERFORMANCE OBJECTIVES:

Visually inspect battery and cables
Visually inspect all electrical connections to starter
Perform voltage crop test between positive post of battery and starter
Perform voltage probe test between starter and ground
Review basic electricity as it pertains to this area
Review use of voltmeter and ampmeter
Use manual for information as to where to hook voltmeter leads 5 crank, voltmeter
6 crank engine
Record readings
Remove voltmeter

IV. STUDENT LEARNING ACTIVITIES:

Review basic electricity as it pertains to this area
Review use of voltmeter, ampmeter
Use manual for information as to where to hook
Voltmeter leads 5 crank, voltmeter 6 crank engine
Record readings
Remove voltmeter

V. EVALUATIONS:

Written exam
Verbal exam

VI. RESOURCES:

Shop manual
Voltmeter manual
Text

VII. SPECIAL NOTES:

Safety glasses
Guard against battery explosion
Fire extinguisher
Know where and how to use eyewash station
Be sure to disconnect the battery prior to removal of starter
Be sure positive cable does not end up touching the manifold after tightening this could cause an electrical fire

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-6 Analyze Ignition System

II. INTRODUCTION:

In order to perform preventive maintenance checks and service while diagnosing ignition problems, knowledge of electricity and the proper use of electrical testing equipment is essential.

III. PERFORMANCE OBJECTIVES:

Use DVOM
Use ignition testers
Use wire diagrams
Understand ignition systems
Use scope
Follow repair procedures

IV. STUDENT LEARNING ACTIVITIES:

Given proper instruction and demonstration, the student will be able to analyze an ignition system on a vehicle to determine if its working properly.

V. EVALUATIONS:

Given proper instruction and demonstration, the student will pass a test of ignition systems with a 80% accuracy level and analyze an ignition system with 100% accuracy.

VI. RESOURCES:

Vehicle
Wiring diagram
DVOM
Ignition systems
Repair manual
Scope
Instructor
Proper hand tools

VII. SPECIAL NOTES:

Student will understand that some analyzing will be more adjust than others and that some systems will produce a harmful electrical shock. Safety should be used at all times.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-6 Analyze Ignition System

II. INTRODUCTION:

III. PERFORMANCE OBJECTIVES:

Preform prevention maintenance checks and services
Diagnose ignition problems
Utilize electrical testing equipment

IV. STUDENT LEARNING ACTIVITIES:

Open vehicle hood
Visually inspect vehicle wiring system
Check all connections are clean and tight/good battery
Remove and inspect distributor cap
Remove and inspect rotor
Inspect ignition coil
Check primary circuit in coil
Check secondary circuit in coil
Inspect rotating part of pick-up (electronic)
Check pick-up coil (electronic)
Check module (electronic)
Check points (conventional)
Check resistors with ohmmeter
Check and set air gap (electronic)
Test plug wires/coil wires
Test spark plugs
Test crank angle sensor (distributorless ignition)

V. EVALUATIONS:

Written test
Job activity (hands on)
Verbal questioning

VI. RESOURCES:

Test equipment operating manuals
Service manuals
General repair manuals
Test books

VII. SPECIAL NOTES:

Use oscilloscope to demonstrate primary and secondary ignition
Safety glasses
Safety goggles
Type C fire extinguisher
Reinforce the danger of electrical systems
Do not touch live wires to metal (frame and body)
Keep hands away from moving parts
Disconnect battery when making system repairs
Keep fuel away from sparks
Never use your hand to pull a high tension wire off spark plug
Disconnect the ground to distributor if you need to crank over

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-7 Analyze Chassis/Body Electrical

II. INTRODUCTION:

Analyzing body electrical is important to be able to solve customer complaints and keep the vehicle in proper working condition. A good understanding of electrical basics is essential.

III. PERFORMANCE OBJECTIVES:

Read wire diagrams
Use DVOM
Use test lite
Read and understand repair manuals

IV. STUDENT LEARNING ACTIVITIES:

Given proper instruction and demonstration, the student will be able to identify chassis and body electrical systems and analyze their operating functions.

V. EVALUATIONS:

The student will pass a written exam on chassis/body electrical wire with 80% accuracy and analyze system function with 100% accuracy.

VI. RESOURCES:

Vehicle
Wire diagrams
DVOM
Test light
Fender covers
Proper hand tools

VII. SPECIAL NOTES:

Student should be aware of the hazards of working with electrical components.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-7 Analyze Chassis/Body Electrical

II. INTRODUCTION:

III. PERFORMANCE OBJECTIVES:

Check headlights high and low beam
Check parking lights
Check directionals
Check brake lights
Check trunk, hood, glove compartment, interior lights
Check brake lights
Check 4-way flashers
Check light switches
Check flashers

IV. STUDENT LEARNING ACTIVITIES:

V. EVALUATIONS:

Completed job sheets
Written exam

VI. RESOURCES:

Shop manuals
Information sheets

VII. SPECIAL NOTES:

Safety glasses
Knowledge of fire extinguisher use
Use of eye wash station
Be sure vehicle is in park and park brake is on when working on electrical systems
Inform instructor of all injuries

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G **CONDUCT ELECTRICAL SYSTEM FUNCTIONS**

TASK: G-8 **Test Problem Area Components**

II. INTRODUCTION:

Once a component has been identified as having a possible fault, a technician needs to be able to properly use appropriate testing equipment and diagnostic procedures to positively identify the component as faulty.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Obtain access to faulty component
Remove and replace component if necessary to properly test
Locate and read any manufacturer's information on proper testing procedure
Locate and connect all appropriate testing equipment
Interpret all readings and information from the testing equipment
Verify component has hot, ground, sensor inputs, and control output signals

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate and test a faulty electrical component using appropriate electrical testing equipment.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate and test a faulty electrical component using appropriate electrical testing equipment. On basic components like light bulbs this will be done with 100% accuracy, and on more complicated components like sensors and engine controls with 75% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive textbooks and repair manuals
Live automobiles or an accurate mock-up representation of an automotive electrical system
Digital volt ohm meter
Test light
Drop light
Basic hand tools

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-9 Repair Defective Components

II. INTRODUCTION:

Once a component has been identified as having a fault, a technician must be able to repair the component if this proves to be economically and practically possible.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

- Obtain access to faulty component
- Remove and replace component if necessary to properly repair
- Locate and read any manufacturer's information on proper repair procedures
- Disassemble part as necessary to repair
- Locate and connect all appropriate testing equipment
- Interpret all readings and information from the testing equipment
- Disconnect, clean and replace any necessary internal parts
- Bench test component if possible
- Reassemble and reinstall component

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to repair a faulty electrical component using appropriate electrical testing equipment and verify repair if possible.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate and test a faulty electrical component using appropriate electrical testing equipment. On basic components this will be done with 100% accuracy, and on more complicated components with 75% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive textbooks and repair manuals
Live automobiles or an accurate mock-up representation of an automotive electrical system
Digital volt ohm meter
Test light
Drop light
Basic hand tools
Replacement parts as necessary

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-10 Replace Defective Components *

II. INTRODUCTION:

Once a component has been identified as having a fault, a technician must be able to replace the component if this proves to be the most economical and practical repair procedure.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

- Obtain access to faulty component
- Locate and read any manufacturer's information on proper removal procedures
- Remove defective component
- Order new component
- Compare new component to old component
- Save old component for customer or core
- Install new component and test operation

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to replace a faulty electrical component using appropriate electrical hand tools and verify repair.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate and replace a faulty electrical component with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive textbooks and repair manuals
Live automobiles or an accurate mock-up representation of an automotive electrical system
Drop light

VI. RESOURCES: (continued)

Basic hand tools
Replacement parts as necessary

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: G CONDUCT ELECTRICAL SYSTEM FUNCTIONS

TASK: G-11 Verify Repairs

II. INTRODUCTION:

Once a component has been repaired or replaced the repair must be verified in order to maintain high service quality standards and good customer relations.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Locate and verify component has been repaired/replaced
Reconnect electrical test equipment if necessary and check that reading are within manufacturer's specifications
Confirm that all surrounding components, shrouds, and fasteners are properly in place
Operate new component
Road test if appropriate
Record repair on work order
File work order

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to verify the repair of a faulty electrical component using manufacturer's specifications and any other test necessary.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to consistently verify any repairs made to a faulty electrical component with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive textbooks and repair manuals
Live automobiles or an accurate mock-up representation of an automotive electrical system

VI. RESOURCES: (continued)

Drop light
Basic hand tools

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: H CONDUCT ACCESSORY SYSTEM FUNCTIONS

TASK: H-1 Identify Accessory Systems *

II. INTRODUCTION:

The student will be able to identify and understand the theory and demonstrate. The knowledge of automotive accessories, at the completion of this unit.

III. PERFORMANCE OBJECTIVES:

The student will be able to identify various accessory components and determine which accessory system they belong to.

IV. STUDENT LEARNING ACTIVITIES:

View filmstrips, videos
Read text and do chapter review questions
Listen to classroom lectures
Shop demonstrations
Have students locate various accessories on automobile

V. EVALUATIONS:

Students will be verbally tested in the shops.
Students will be evaluated with written tests or quizzes.

VI. RESOURCES:

Textbook
Film strips
Videos
Mock up
Accessory board
Automobile with necessary accessories, tools, and test equipment

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: H CONDUCT ACCESSORY SYSTEM FUNCTIONS

TASK: H-2 Identify Problem Area/Type

II. INTRODUCTION:

Students will be able to identify problem areas/type by understanding the unique characteristics of problems of specific accessory components.

III. PERFORMANCE OBJECTIVES:

The student will be able to isolate specific accessory problems to specific components, types, and systems using the repair order and service manuals.

IV. STUDENT LEARNING ACTIVITIES:

View filmstrips/videos
Classroom lectures and demonstrations
Mock ups and automobiles to test and identify problem components

V. EVALUATIONS:

Students will be verbally tested in shop using mock up and automobiles with a problem area.

VI. RESOURCES:

Shop manuals
Automobile with problem areas
Mock ups

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: H CONDUCT ACCESSORY SYSTEM FUNCTIONS

TASK: H-3 **Test Electrical Functions**

II. INTRODUCTION:

After the student has completed a unit on electrical theory, accessory identification, and identifying problem areas, the student will test electrical functions of an accessory.

III. PERFORMANCE OBJECTIVES:

The students will verify the complaint listed on the work order and test functions of the specific unit using correct test equipment and information obtained from a shop manual.

IV. STUDENT LEARNING ACTIVITIES:

Classroom lectures and individual instruction on specific electrical accessory problems, using automobile and/or mock ups.
Review basic electrical theory.

V. EVALUATIONS:

Instructor will verify students performance by checking accuracy in troubleshooting complaint.

VI. RESOURCES:

Shop manuals
Wiring diagrams
Mock up
Automobile

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: H CONDUCT ACCESSORY SYSTEM FUNCTIONS

TASK: H-4 Test Mechanical Functions

II. INTRODUCTION:

In order to verify a customer's complaint or to make a proper diagnoses, it is very important to have a good understanding of just how a particular accessory is designed to operate. Each time an accessory is operated, its performance needs to be compared to a known standard to properly evaluate its performance.

III. PERFORMANCE OBJECTIVES:

Operate vehicle accessories i.e. power windows, door locks, seats, air conditioning, radio, wipers, cruise control, etc.
Compare actual operation with a known standard
Understand operation of all vehicle accessories
Know physical location of vehicle accessories

IV. STUDENT LEARNING ACTIVITIES:

Using a live vehicle, demonstrate the operation and purpose of all common vehicle accessories.
Explain "normal operation" and what are common faults for each accessory.
Describe location of each accessory and its related components.

V. EVALUATIONS:

Observe student operate accessories
Question student as to the quality of operation as compared to "normal"
Have student make list of all common accessories.
With each accessory listed, have student give brief description of what the purpose of the accessory is and how it functions.

VI. RESOURCES:

Live vehicle with common accessories
Owner's manual

VII. SPECIAL NOTES:

Be sure that all necessary and appropriate safety precautions are observed to protect both the student and equipment from damage.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: H CONDUCT ACCESSORY SYSTEM FUNCTIONS

TASK: H-5 Test Vacuum System

II. INTRODUCTION:

Many on-board accessory systems have either full or partial vacuum components that assist in the operation of the accessory. A good example is the air conditioning system that uses vacuum to operate damper doors in the dash to direct air flow. Another example would be the cruise control that employs vacuum to operate servos that apply throttle pressure. A leak or blockage in any of the vacuum systems could cause poor operation or even failure of the system to operate.

III. PERFORMANCE OBJECTIVES:

Use vacuum system testing equipment
Read vacuum schematics
Identify vacuum system components
Perform vacuum system visual inspection
Perform vacuum system tests using test equipment

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate use of vacuum system test equipment, i.e. vacuum pump, vacuum gauges.
Do activities in student text and workbook pertaining to vacuum systems.
Work with actual vacuum schematics to trace vacuum systems hose routing and component location.
Demonstrate location and function of vacuum system components.
Using mock ups, demonstrate components such as vacuum servos, switches, delay valves, etc.
Using live vehicle, demonstrate how to perform visual inspection of vacuum systems.
Point out things like hardened hoses and tubing, cracks and splits, bent or otherwise out of place servos and mechanical linkage, etc.
Demonstrate use of vacuum test equipment and proper testing and diagnostic procedures.

V. EVALUATIONS:

Written examination on use of vacuum schematics.
Bug live vehicle and observe the student in testing and diagnosing problem.
Orally quiz student as to location of specific vacuum system component functions.

VI. RESOURCES:

Student text and workbooks
Vacuum schematics shop manual
Live vehicle
Audio/visual aides
Vacuum system testing equipment

VII. SPECIAL NOTES:

Be sure that all necessary and appropriate safety precautions are observed to protect both the student and equipment from damage.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: H CONDUCT ACCESSORY SYSTEM FUNCTIONS

TASK: H-6 Isolate Noises

II. INTRODUCTION:

Certain accessory sounds are considered "normal." In some instances, the sounds that are made by accessories exceed the normal boundaries and cause concern. Many times these unusual noises can be an indication of an eminent part and or system failure. When unusual noises occur, the technician must be able to distinguish them from the normal sounds accessories make and isolate the noises to facilitate a repair or an adjustment.

III. PERFORMANCE OBJECTIVES:

Distinguish abnormal noises from normal noises
Recreate abnormal noise situations
Use techniques to isolate noises such as hissing, squealing, thumping, squeaking, rattling, clicking, buzzing, rubbing, etc.

IV. STUDENT LEARNING ACTIVITIES:

Use live vehicle and mock ups, to demonstrate abnormal noises.
Demonstrate methods of recreating unusual noise situations such as "over bumps," or "when turning to the right or left," etc.
Demonstrate use of noise isolating equipment such as a stethoscope, long screw driver or rubber hose.

V. EVALUATIONS:

Observe student verifying, by recreation, the noise to be isolated.
Observe student's use of isolating equipment to zero in on an accessory noise.

VI. RESOURCES:

Student text and workbooks
Live vehicle with bugs

VII. SPECIAL NOTES:

Be sure that all necessary and appropriate safety precautions are observed to protect both the student and equipment from damage.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: H CONDUCT ACCESSORY SYSTEM FUNCTIONS

TASK: H-7 Repair System Problem

II. INTRODUCTION:

Once proper diagnosis has been completed and the problem located within the accessory system, more than likely a repair of the system is all that will be needed rather than a replacement of a component.

Common problems such as loose connections, bad wires and improper repairs are responsible for the majority of a accessory svstem failure.

III. PERFORMANCE OBJECTIVES:

The student will be able to determine the repair procedure of an accessory system, tools and equipment needed, and then make the appropriate repair.

IV. STUDENT LEARNING ACTIVITIES:

Determine the defective area.
Research the repair procedure.
Determine tools and equipment needed.
Perform the needed repair.
Verify the repair.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to repair the defective accessory component/area to a like new condition.

VI. RESOURCES:

Text Book
Service Manual
Wiring Diagrams
Class Notes
Equipment Instructions

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: H CONDUCT ACCESSORY SYSTEM FUNCTIONS

TASK: H-8 Replace System Components *

II. INTRODUCTION:

When it has been determined that an accessory system component is defective beyond repair, then it must be replaced. Proper removal and replacement of the component will ensure proper operation of the accessory system.

III. PERFORMANCE OBJECTIVES:

The student will be able to replace a defective accessory system component, and restore the defective system to a like new condition.

IV. STUDENT LEARNING ACTIVITIES:

Determine defective component.
Research replacement procedure.
Determine tools and equipment needed.
Replace defective component.
Verify repair.

V. EVALUATIONS:

Given appropriate instruction and demonstration the student will be able to properly replace a defective accessory system component, and restore the system to a like new condition.

VI. RESOURCES:

Text Book
Service Manual
Wiring Diagrams
Class Notes

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: H CONDUCT ACCESSORY SYSTEM FUNCTIONS

TASK: H-9 Verify Repairs

II. INTRODUCTION:

Once a component in the Accessory System has been repaired or replace the repair must be verified in order to maintain high service quality standards and good customer relations.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

- Locate and verify that component has been repaired/replaced.
- Reconnect any test equipment if necessary and check that readings are within manufacturer's specifications.
- Confirm that all surrounding components, shrouds, and fasteners are properly in place.
- Operate new component.
- Road test if appropriate.
- Record repair on work order.
- File work order.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to verify the repair of an Accessory System using manufacturer's specifications and other live tests as necessary.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to consistently verify any repairs made to an Accessory System with 100% accuracy.

VI. RESOURCES:

- Appropriate and up-to-date automotive text books and repair manuals.
- Live automobiles or an accurate mock-up representation of an automotive accessory system.

VI. RESOURCES: (continued)

Drop light
Basic hand tools
DVOM
Stethoscope
Vacuum pump and gauge

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: I **CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS**

TASK: I-1 **Identify Heating/Air Conditioning Systems ***

II. INTRODUCTION:

An air conditioning (A/C) system normally works with the heating and ventilation system. The A/C provides cool, dehumidified air. The heating system supplies warm air, using heat from the engine cooling system. The ventilation system carries fresh, outside air into the vehicle. This is important information for an automotive technician.

III. PERFORMANCE OBJECTIVES:

Explain principles of refrigeration
Describe four cycles of refrigeration
Describe high and low pressure sides of an A/C system
Explain basic function and construction of major parts of heating an A/C systems
Summarize operation and interaction of heating, ventilating, and A/C systems
Describe safety precautions to be observed when working on these systems

IV. STUDENT LEARNING ACTIVITIES:

Read text
Watch videos
Given an A/C system diagram, identify components, separate high and low pressures, and trace flow of refrigerant liquid and vapor through the system.
Locate and identify components, high and low pressure sides, and trace the flow of refrigerant liquid and vapor through the system of a vehicle provided by the instructor.
Using a diagram, identify points of basic heat exchange.

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will correctly answer 70% of the questions on a written test.
Assigned a vehicle by the instructor, the student will identify the A/C components and high and low pressure sides with 100% accuracy.

VI. RESOURCES:

Textbook
Workbook
Videos
Repair manuals
Shop manuals
Shop, student, faculty, and staff vehicles

VII. SPECIAL NOTES:

An A/C refrigerant recovery and recycling machine is required by Federal Law to service and repair A/C systems.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: I **CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS**

TASK: I-2 **Perform Visual/Hands-On Check ***

II. INTRODUCTION:

An air conditioning (A/C) system that is low on refrigerant usually has a leak. Most leaks can be found where parts are connected to one another. One method of leak detection is to visually inspect all components for oil deposits, which indicates a refrigerant leak. This is important information for an automotive technician.

III. PERFORMANCE OBJECTIVES:

Conduct 10-point visual inspection to include:

- compressor clutch seal
- compressor high and low connections
- high pressure line to condenser connections
- condenser
- high pressure line out of condenser connection
- low pressure cut-off switch
- high pressure line to orifice tube connection
- evaporator to accumulator connection
- accumulator
- accumulator to low pressure line connection

IV. STUDENT LEARNING ACTIVITIES:

Using a vehicle provided by the instructor, the student will perform the 10-point visual inspection as listed in the performance objectives.

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will perform the 10-point visual inspection with 100% accuracy on a vehicle provided by the instructor.

VI. RESOURCES:

Manufacturer manuals
Shop manuals

VI. RESOURCES: (continued)

Repair manuals
Staff, faculty, and shop vehicles

VII. SPECIAL NOTES:

Be sure to connect the shop's exhaust system to the vehicle being tested.
Always wear safety glasses when working with refrigerant.
Avoid any skin contact with the refrigerant as it could cause frost bite.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: I CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS

TASK: I-3 Test Mechanical Operations

II. INTRODUCTION:

Compressor malfunctions will appear as abnormal noises, seizures, leakage, or high-inlet or low-discharge pressures. Some pumping noise is normal, however, loud knocking or rattling noises from the compressor indicate serious problems.

Improper compressor clutch operation can be caused by incorrect refrigerant pressures, electrical problems, and faulty protection devices. Therefore, it is important for the automotive technician to know how to test and analyze compressor functions.

III. PERFORMANCE OBJECTIVES:

Determine compressor clutch operation
Determine compressor operation
Determine if compressor is abnormally noisy

IV. STUDENT LEARNING ACTIVITIES:

Students will visually inspect compressor clutch for engagement
Students will listen to compressor for abnormal noises

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will determine proper operation of the air conditioning clutch and compressor on vehicles provided by the instructor with 100% accuracy.

VI. RESOURCES:

Textbook
Workbook
Shop manual
Repair manual
Shop, staff, student, and faculty vehicles

VII. SPECIAL NOTES:

Working around refrigerants under high pressure is very dangerous. BE SURE STUDENTS FOLLOW ALL SAFETY PRECAUTIONS

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: I CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS

TASK: I-4 Test Electrical Functions

II. INTRODUCTION:

The A/C Heating System on todays cars incorporate numerous Electrical/Electronic Functions. These functions are totally controlled by electrical circuits, both in a monitoring sense as well as in an actual physical sense.

III. PERFORMANCE OBJECTIVES:

Upon completion of this task, the student will be able to test electrical functions for their proper operation.

IV. STUDENT LEARNING ACTIVITIES:

Class lectures
Clinics
Seminars
Live work
Mock-ups

V. EVALUATIONS:

Performance and rate of efficiency
Students questions and answers
Quizzes/Tests

VI. RESOURCES:

Service manuals
Text
Mitchell on-line demand

VII. SPECIAL NOTES:

Students should be aware of the complex nature of todays climate control systems, and possess a sound background regarding theory of operation before jumping into diagnosis.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: I CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS

TASK: I-5 Test Vacuum System and Activators

II. INTRODUCTION:

The vacuum system on older vehicles in conjunction with activators are used in the operation of values and positioning of all mode doors for automatic climate control systems. All newer systems have replaced vacuum signals with electrical operations.

III. PERFORMANCE OBJECTIVES:

Upon successful completion of this task, the student will be able to test vacuum systems for proper operation.

IV. STUDENT LEARNING ACTIVITIES:

Class lectures
Clinics
Seminars
Live work
Mock-ups

V. EVALUATIONS:

Performance and rate of proficiency
Students questions and answers thru discussions
Quizzes/Test

VI. RESOURCES:

Service manuals
Textbooks
Mitchell on-line demand

VII. SPECIAL NOTES:

The student needs to be aware that vacuum controls in most situations are being replaced by electrical circuitry and motors.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: I CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS

TASK: I-6 Test Temperatures in Circulation Systems

II. INTRODUCTION:

Heating and air conditioning systems provide warmed or cooled air to the passenger compartment. Air conditioning systems involve checks for damage and proper operation as well as special procedures.

III. PERFORMANCE OBJECTIVES:

Upon completion of this task, students will be able to verify the proper operation of the A/C system regarding cab temperatures.

IV. STUDENT LEARNING ACTIVITIES:

Class lectures
Clinics
Seminars
Live work

V. EVALUATIONS:

Performance and rate of proficiency
Students questions and answers thru discussions
Quizzes/Tests

VI. RESOURCES:

Service manuals
Textbooks
Mitchell on-line demand

VII. SPECIAL NOTES:

Special precautions should be taken when working with R-12.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: I CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS

TASK: I-7 Test System for leaks

II. INTRODUCTION:

In a typical A/C system, there are many fittings and seals that prevent refrigerant from escaping the system. These are susceptible to leakage as are many other components to the system.

III. PERFORMANCE OBJECTIVES:

Upon completion of this task, students will be able to verify and diagnose A/C systems for leaks safely and accurately.

IV. STUDENT LEARNING ACTIVITIES:

Class lectures
Clinics
Seminars
Live work
Discussions

V. EVALUATIONS:

Performance and rate of proficiency
Students questions and answers through discussions
Quizzes/Tests

VI. RESOURCES:

Service manuals
Mitchell on-line demand

VII. SPECIAL NOTES:

Consult service manual pertaining to the addition of refrigerant oils for lubrication. Awareness of freon hazards to themselves as well as atmosphere.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: I CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS

TASK: I-8 Repair defective components

II. INTRODUCTION:

For the air conditioning/heating system to function properly, all system components must be working properly. If a component cannot be effectively repaired, it must be replaced.

III. PERFORMANCE OBJECTIVES:

Upon completion of this task, the student will be able to isolate a problem area, and verify that diagnosis. The student will through a systematic approach test and repair defective components.

IV. STUDENT LEARNING ACTIVITIES:

Class lectures
Clinics
Seminars
Live work

V. EVALUATIONS:

Performance and rate of proficiency
Students questions and answers through discussion
Quizzes/Tests

VI. RESOURCES:

Service manuals
Mitchell on-line demand

VII. SPECIAL NOTES:

Awareness of freon hazards and other gasses in today's systems regarding safety to themselves as well as the environment.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: I** **CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS**

TASK: I-9 **Replace Defective Components**

II. INTRODUCTION:

Once a component in the Air Conditioning/Heating System has been identified as having a fault, a technician must be able to replace the component if this proves to be the most economical and practical repair procedure.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Obtain access to faulty component.
Locate and read any manufacturer's information on proper removal procedures.
Remove defective component.
Order new component.
Compare new component to old component.
Save old component for customer or core return.
Install new component.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to replace a faulty Air Conditioning/Heating System component using appropriate hand tools.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate and replace a faulty Air Conditioning/Heating System component with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automotive accessory system.
Drop light
Basic hand tools
Replacement parts as necessary

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: I **CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS**

TASK: I-10 **Charge Air Conditioning System**

II. INTRODUCTION:

In order for the Air Conditioning System to operate properly it must contain the proper type and amount of refrigerant. Additionally, there must be no leaks of the freon to the atmosphere or dangerous pressures present in the system.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Locate and read any manufacturer's information on proper evacuating and charging procedures.
Identify whether the system is using R-12 or R-134a freon.
Locate the A/C high and low pressure ports.
Safely connect the A/C service equipment to the automotive A/C system.
Safely be able to evacuate any remaining freon in the A/C system and test for vacuum leaks.
Add the proper amounts of oil and freon to the system.
Read and understand the high and low pressure gauges to monitor A/C system functions.
Check system for leaks with a modern electronic freon tester.
Check operation of A/C cut-out circuits and auxiliary cooling fan operation.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to evacuate and charge an air conditioning system and monitor its level of performance.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to evacuate and charge an air conditioning system component with 100% accuracy under the supervision of a qualified instructor.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automotive air conditioning system
Drop light
Basic hand tools
R-12 or R-134a Charging equipment with a supply of new or recycled freon
Electronic freon leak tester
Work order

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: I CONDUCT AIR CONDITIONING/HEATING SYSTEM FUNCTIONS

TASK: I-11 Verify Repairs

II. INTRODUCTION:

Once a component in the Air Conditioning/Heating System has been repaired or replaced the repair must be verified in order to maintain high service quality standards and good customer relations.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Locate and verify that component has been repaired/replaced.
Reconnect any test equipment if necessary and check that readings are within manufacturer's specifications.
Confirm that all surrounding components, shrouds, and fasteners are properly in place.
Operate new component.
Road test if appropriate.
Record repair on work order.
File work order.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to verify the repair of an Air Conditioning/Heating System using manufacturers specifications and other live tests as necessary.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to consistently verify any repairs made to an Air Conditioning/Heating System with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of a drive train.
Drop light
Basic hand tools
A/C Pressure gauges
Electronic Freon Tester
Thermometer

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: J CONDUCT ENGINE MECHANICAL FUNCTIONS

TASK: J-1 Identify Engine Type *

II. INTRODUCTION:

Before any service, diagnosis, or repairs can be carried out on engine, a technician must be able to identify the engine type including: # of cylinders, displacement, cylinder arrangement, 2/4 stroke, fuel type, and firing order.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Locate and read any manufacturer's emissions sticker for information on engine displacement and other related information.
Identify the number of cylinders.
Identify whether the engine has a 2 or 4 stroke design.
Identify the cylinder arrangement,
Identify the firing order.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to identify the type of engine.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to identify the type of engine with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automotive engine assembly with identifying stickers.
Drop light
Work order

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: J CONDUCT ENGINE MECHANICAL FUNCTIONS

TASK: J-2 Analyze Mechanical Operations

II. INTRODUCTION:

Before any tune-up or engine performance can be done, the technician must be certain that an engine is mechanically sound. The condition of the timing chain/belt/gears, the pistons and rings, and the valves must all be analyzed in order to assure a properly running automobile.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Locate and read the manufacturer's engine mechanical data such as valve clearance and compression specifications.

Remove and replace valve cover and check valve clearances.

Check for timing chain/belt/gear wear.

Carry out a complete wet/dry compression test.

* Remove all spark plugs
* Disable ignition and fuel system
* Connect a remote starter button when practical
* Install compression gauge in a cylinder plug hole
* Crank engine through four compression strokes
* Record reading
* Repeat test after adding a small amount of oil
* Repeat steps for each cylinder
* Use manual to interpret results

Carry out a complete leak down test.

* Remove all spark plugs
* Set the first piston at a few degrees before TDC compression stroke
* Install a leak down tester to cylinder
* Using shop air and specific tool directions read the leak down results for that cylinder
* Repeat for each cylinder in the engine
* Use a suitable shop manual to interpret the results of the test

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to verify the mechanical condition of the engine including: the timing chain/belt/gears, the pistons and rings, and valves.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to check valve clearances, timing chain/belt/gear condition, compression readings and leak down results. Each step will be tested separately and will be done in an efficient manner with 80% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automotive engine assembly with identifying stickers.
Drop light
Basic hand tools
Feeler gauges
Compression gauge
Leak down tester
Work order

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: J CONDUCT ENGINE MECHANICAL FUNCTIONS

TASK: J-3 Perform Visual Components Check

II. INTRODUCTION:

One of the most important steps in diagnosing an engine mechanical problem is to visually inspect all systems under the hood of the car. Learning to perform this skill is a must for all auto technicians.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

- Use a drop light.
- Confirm that the engine and all related components are original equipment.
- Inspect wires for worn condition and proper routing.
- Inspect hoses for worn condition and proper routing.
- Inspect belts, pulleys and cooling fan for wear and misalignment.
- Inspect for oil leaks at the: valve cover, timing cover, oil pan, front and rear main seal, and head gasket(s).
- Inspect for coolant leaks at the: intake manifold, thermostat housing, block drains, water pump, and head gasket(s).
- Inspect engine mounts for wear and cracks.
- Check oil and coolant levels and condition.
- Inspect the air filter housing and PCV system for proper operation.
- Identify any other damaged or unusual underhood conditions.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to verify visually, the mechanical condition of the engine.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to visually inspect and record his/her finding of worn or questionable components. This will be carried out in a timely fashion and with 100% accuracy concerning any safety related engine component(s).

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automotive engine assembly with identifying stickers.
Drop light
Basic hand tools
Car hoist
Work order

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: J **CONDUCT ENGINE MECHANICAL FUNCTIONS**

TASK: J-4 **Identify Engine Problem Area**

II. INTRODUCTION:

After a technician has analyzed the mechanical operations and done a visual inspection of the engine, he/she must be able to interpret the information in order to identify the specific engine problem area.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Collect all test results on an industry-like work order.
Using a current shop manual, interpret the data and identify the engine problem area.
Write down the reasons for the diagnosis.
Write down the most likely steps involved in repairing the problem area.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to interpret the information gathered from the test vehicle in order to identify the specific engine problem area.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to interpret the information in order to identify the specific engine problem area. This response should be in written form similar to a professional work order. This will be carried out in a timely fashion and with 100% accuracy concerning any safety related engine component(s).

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automobile.
Work order with test result information
Current shop manuals

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: J CONDUCT ENGINE MECHANICAL FUNCTIONS

TASK: J-5 Check for Unusual Noises

II. INTRODUCTION:

There are many kinds of engine noises. Some of these noises are normal operating noises or characteristics of certain makes and types of engines, so they are of no consequence. Other louder and more disturbing noises are indications of serious mechanical trouble that requires prompt attention to prevent major damage to the engine.

Although not infallible, an experienced and educated ear, aided by a listening rod or stethoscope, will save time and money in locating the cause of mechanical trouble.

III: PERFORMANCE OBJECTIVES:

Determine normal and abnormal sounds made at various locations around engine

IV. STUDENT LEARNING ACTIVITIES:

Read text
Use stethoscope or listening rod
Discuss what sounds are made by various problem components

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will correctly answer a minimum of 70% of the questions on a written or oral test.

VI. RESOURCES:

Text
Shop manuals
McQuay-Norris engine handbook

VII. SPECIAL NOTES:

Finding a vehicle to effectively acquaint a student with all the necessary abnormal noises would be impossible.

Some sounds can be imitated by the instructor.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: J CONDUCT ENGINE MECHANICAL FUNCTIONS

TASK: J-6 Analyze Engine Systems

II. INTRODUCTION:

An engine (lubrication) system has several important functions. The system:
- reduces friction and wear between moving parts;
- helps transfer heat and cool engine parts;
- cleans the inside of the engine;
- cuts power loss and increases fuel economy; and
- absorbs shock between moving parts.

It is vital for an automotive technician to be trained in all these.

III. PERFORMANCE OBJECTIVES:

- List basic parts of lubrication system
- Summarize operation of lubrication system
- Compare different lubricating designs
- Explain characteristics and ratings of motor oil
- Discuss safety procedures to follow when working with lubricating system

IV. STUDENT LEARNING ACTIVITIES:

- Read text
- Watch video
- Identify parts of an oil pump
- List the four major purposes of motor oil
- Given a diagram of the lubricating system, identify the numbered parts
- Use a work sheet to test engine oil pressure using a test pressure gauge

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will correctly answer 70% of the questions on a written test.

Given a pressure test kit, the student will test engine oil pressure on a vehicle provided by the instructor with 100% accuracy.

VI. RESOURCES:

Textbook
Workbook
Shop manuals
Repair manuals
Live vehicles

VII. SPECIAL NOTES:

Remind students that the w in 10w-30 motor oil stands for winter and not weight.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: J CONDUCT ENGINE MECHANICAL FUNCTIONS

TASK: J-7 Isolate Problem Components (Teardown/Inspect)

II. INTRODUCTION:

Almost all technicians, at one time or another, are required to work on an engine and must be able to isolate, tear down, and inspect components.

III. PERFORMANCE OBJECTIVES:

Troubleshoot the following:
- high oil consumption
- low oil pressure
- high oil pressure
- indicator or gauge circuit

IV. STUDENT LEARNING ACTIVITIES:

Diagnose lubrication system troubles
Test and repair oil pressure indicating light or gauge
Service oil pump
Remove and install engine oil pan
Inspect engine bearings for wear

V. EVALUATIONS:

Given appropriate instruction/demonstration, the student will correctly answer 70% of the questions on a written test.

Assigned a vehicle or shop engine, the student will diagnose lubrication system troubles with 100% accuracy.

VI. RESOURCES:

Shop manuals
Shop engines
Textbook
Workbook
Video tapes

VII. SPECIAL NOTES:

Some oil pans can be removed with the engine in the car.
Other vehicles designs do NOT allow in-car oil pan removal.
The engine must be lifted from the frame before the pan will come off.
Check the service manual for details.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: J CONDUCT ENGINE MECHANICAL FUNCTIONS

TASK: J-8 Repair Defective Engine Components

II. INTRODUCTION:

Once a component has been identified as having a fault, a technician must be able to repair the component if this proves to be economically and practically possible.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Obtain access to faulty component.
Remove and reinstall component if necessary to properly repair.
Locate and read any manufacturer's information on proper repair procedures.
Disassemble part as necessary to repair.
Locate and connect all appropriate testing equipment.
Interpret all readings and information from the testing equipment.
Disconnect, clean and replace any necessary internal parts.
Bench test component if possible.
Reassemble and reinstall component.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to repair a faulty engine component using appropriate testing equipment and verify repair if possible.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate and test a faulty engine component using appropriate testing equipment. On basic components this will be done with 100% accuracy, and on more complicated components with 75% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automotive engine system.
Drop light
Basic hand tools
Special tools as required
Replacement parts as necessary

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: J CONDUCT ENGINE MECHANICAL FUNCTIONS**

TASK: J-9 Replace Defective or Engine Components

II. INTRODUCTION:

Once a component has been identified as having a fault, a technician must be able to replace the component if this proves to be the most economical and practical repair procedure.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Obtain access to faulty component.
Locate and read any manufacturer's information on proper removal procedures.
Remove defective component.
Order new component.
Compare new component to old component.
Save old component for customer or core.
Install new component and test operation.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to replace a faulty engine component using appropriate hand tools and verify repair.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate and replace a faulty engine component with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automotive engine system.
Drop light

VI. RESOURCES: (continued)

Basic hand tools
Replacement parts as necessary

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: J CONDUCT ENGINE MECHANICAL FUNCTIONS

TASK: J-10 Verify Repairs

II. INTRODUCTION:

Once a component in the engine system has been repaired or replaced the repair must be verified in order to maintain high service quality standards and good customer relations.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Locate and verify that component has been repaired/replaced.
Reconnect any test equipment if necessary and check that readings are within manufacturer's specifications.
Confirm that all surrounding components, shrouds, and fasteners are properly in place.
Operate new component.
Road test if appropriate.
Record repair on work order.
File work order.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to verify the repair of an engine system using manufacturer's specifications and other live tests as necessary.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to consistently verify any repairs made to an engine system with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of a engine system.

VI. RESOURCES: (continued)

Drop light
Basic hand tools
Torque wrench

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTIONS

TASK: K-1 Identify Emission Systems *

II. INTRODUCTION:

Modern engines are utilizing emission controls to meet federal standards, therefore, identifying these systems are a must when attempting any repairs on these vehicles.

III. PERFORMANCE OBJECTIVES:

Given a vehicle, the student will identify and locate the following emission systems:

Air Injection System
Early Fuel Evaporation System
Evaporation Emission Control System
Positive Crankcase Ventilation System
Exhaust Gas Recirculation System
Thermostatic Air Cleaner System
Catalytic Converter System
Electronic Engine Control System

IV. STUDENT LEARNING ACTIVITIES:

Instructor's lecture/demonstration, film strip/video on emission systems, mock-ups, various vehicles, service manuals, textbook

V. EVALUATIONS:

Student will identify all emission systems on a vehicle provided by the instructor with 100% accuracy.

VI. RESOURCES:

Shop manuals
Service manuals
Emission manuals
Textbooks
Film strips/videos

VI. RESOURCES: (continued)

Mock-ups
Training aids

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTIONS

TASK: K-2 Perform Visual System Check *

II. INTRODUCTION:

One of the first steps in many repairs is to perform a visual inspection. Many times the repair is simply a broken part or hose or a part that may have become loose or disconnected. Therefore, the automotive technician must conduct visual system checks before making the repair more of a job than it needs to be.

III. PERFORMANCE OBJECTIVES:

The student will observe that the following conditions do not exist:

HOSES: cracked, broken, loose, or split
BELTS: worn, loose, missing, glazed, oil soaked
WIRES & CONNECTIONS: frayed, loose, corroded, broken, or disconnected
COMPONENTS: missing, rusted out, loose, seized, or broken

IV. STUDENT LEARNING ACTIVITIES:

Instructors lecture/demonstration
Service manuals
Shop vehicles
Textbook
Videos

V. EVALUATIONS:

Given a vehicle, the student will identify all problem areas with 100% accuracy.

VI. RESOURCES:

Shop manuals
Service manuals
Overheads
Textbook
Emission manuals
Training aids

VI. RESOURCES: (continued)

Videos/film strips
Mock-ups

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTIONS

TASK: K-3 **Perform Functional Check of System**
K-3 (a) **Evaporative Emission Control System**

II. INTRODUCTION:

III. PERFORMANCE OBJECTIVES:

Given a vehicle, the student will test the Evaporative Emission Control System for proper operation.

IV. STUDENT LEARNING ACTIVITIES:

Instructor's lecture/demonstration on how to properly test the Evaporative Emission Control System components.

V. EVALUATIONS:

Student demonstrates testing the Evaporative Emission Control System using the correct shop manual and properly testing all components in the system.
The student will explain the results of the test.

VI. RESOURCES:

Shop manuals
Service manuals
Emissions manuals

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTIONS

TASK: K-3 Perform Functional Check of System
K-3 (b) Air Injection System

II. INTRODUCTION:

III. PERFORMANCE OBJECTIVES:

Given a vehicle, the student will test the Air Injection System for proper operation.

IV. STUDENT LEARNING ACTIVITIES:

Instructor's lecture/demonstration on how to properly test the Air Injection System components.

V. EVALUATIONS:

Student demonstrates testing the Air Injection System using the correct shop manual and properly testing all components in the system.
The student will explain the results of the test.

VI. RESOURCES:

Shop manuals
Service manuals
Emission manuals

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTIONS

TASK: K-3 Perform Functional Check of System
K-3 (c) Early Fuel Evaporation System

II. INTRODUCTION:

III. PERFORMANCE OBJECTIVES:

Given a vehicle, the student will test the Early Fuel Evaporation System for proper operation.

IV. STUDENT LEARNING ACTIVITIES:

Instructors lecture/demonstration on how to properly test the Early Fuel Evaporation System components.

V. EVALUATIONS:

Student demonstrates testing the Early Fuel Evaporation System using the correct shop manual and properly testing all components in the system.
The student will explain the results of the test.

VI. RESOURCES:

Shop manuals
Service manuals
Emission manuals

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K **CONDUCT EMISSIONS SYSTEM FUNCTIONS**

TASK: **K-3 Perform Functional Check of System**
K-3 (d) Positive Crankcase Ventilation System

II. INTRODUCTION:

III. PERFORMANCE OBJECTIVES:

Given a vehicle, the student will test the Positive Crankcase Ventilation System for proper operation.

IV. STUDENT LEARNING ACTIVITIES:

Instructors lecture/demonstration on how to properly test the Positive Crankcase Ventilation System components.

V. EVALUATIONS:

Student demonstrates testing the Positive Crankcase Ventilation System using the correct shop manual and properly testing all components in the system. The student will explain the results of the test.

VI. RESOURCES:

Shop manuals
Service manuals
Emission manuals

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTIONS

TASK: K-3 Perform Functional Check of System
K-3 (e) Exhaust Gas Recirculation System

II. INTRODUCTION:

III. PERFORMANCE OBJECTIVES:

Given a vehicle, the student will test the Exhaust Gas Recirculation System for proper operation.

IV. STUDENT LEARNING ACTIVITIES:

Instructors lecture/demonstration on how to properly test the Exhaust Gas Recirculation System components.

V. EVALUATIONS:

Student demonstrates testing the Exhaust Gas Recirculation System using the correct shop manual and properly testing all components in the system. The student will explain the results of the test.

VI. RESOURCES:

Shop manuals
Service manuals
Emission manuals

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTION**

TASK: K-3 Perform Functional Check of System
K-3 (f) Thermostatic Air Cleaner System

II. INTRODUCTION:

III. PERFORMANCE OBJECTIVES:

Given a vehicle, the student will test the Thermostatic Air Cleaner System for proper operation.

IV. STUDENT LEARNING ACTIVITIES:

Instructors lecture/demonstration on how to properly test the Thermostatic Air Cleaner System components.

V. EVALUATIONS:

Student demonstrates testing the Thermostatic Air Cleaner System using the correct shop manual and properly testing all components in the system. The student will explain the results of the test.

VI. RESOURCES:

Shop manuals
Service manuals
Emission manuals

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTIONS

TASK: K-3 Perform Functional Check of System
K-3 (g) Catalytic Converter System

II. INTRODUCTION:

III. PERFORMANCE OBJECTIVES:

Given a vehicle, the student will test the Catalytic Converter System for proper operation.

IV. STUDENT LEARNING ACTIVITIES:

Instructors lecture/demonstration on how to properly test the Catalytic Converter System components.

V. EVALUATIONS:

Student demonstrates testing the Catalytic Converter System using the correct shop manual and properly testing all components in the system.
The student will explain the results of the test.

VI. RESOURCES:

Shop manuals
Service manuals
Emission manuals

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTIONS

TASK: K-3 Perform Functional Check of System
K-3 (h) Electronic Engine Control System

II. INTRODUCTION:

Since 1981 all vehicles made in the U.S. have had on-board computers to reduce emissions, increase gas mileage, improve driverability and power. Without a thorough knowledge of this system a mechanic is severely handicapped.

III. PERFORMANCE OBJECTIVES:

Given a vehicle, the student will perform a systems performance check on the Electronic Engine Control System.

IV.. STUDENT LEARNING ACTIVITIES:

Instructors lecture/demonstration on Electronic Engine Controls, the use of scan tools, how the system works along with various sensors and accuators.

V. EVALUATIONS:

Student demonstrates testing the Electronic Engine Control using the correct service manual, tools, and equipment necessary to do the job.
The student will record all trouble codes if any, and will explain the results of the test.

VI. RESOURCES:

Shop manuals
Service manuals
Overheads
Film strips
Textbook
Emission manuals
Training course on Electronic Engine Controls
Videos
Various sensors

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTION

TASK: K-4 Analyze Exhaust Gasses

II. INTRODUCTION:

Many emission problems and even some engine problems can be solved using an Exhaust Gas Analyzer. Because of emission testing, all repairs should be tested using a 4-Gas analyzer to insure that proper repairs have been done.

III. PERFORMANCE OBJECTIVES:

Given a vehicle and the proper test equipment, the student will test the exhaust gasses and make the determination of one of the following:

Engine exhaust normal;
Engine exhaust rich;
Engine exhaust lean; and
Engine suffers from mechanic wear

IV. STUDENT LEARNING ACTIVITIES:

Instructor provides instruction on exhaust gasses their causes and correction, and on how to use the equipment.

V. EVALUATIONS:

Student correctly analyzes exhaust gasses.

VI. RESOURCES:

Shop manuals
Service manual for equipment
Overheads
Textbook
Training aids
Videos
Emission manuals
Film strips

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTIONS

TASK: K-5 Diagnose Problem Area

II. INTRODUCTION:

Emission controls have been installed to remove compounds that pollute the air and to meet federal and state laws. The proper maintenance and repair of these devices are necessary to avoid legal problems.

III. PERFORMANCE OBJECTIVES:

Student will use proper procedure to diagnose emission system problems.

IV. STUDENT LEARNING ACTIVITIES:

Visual check of emission system
Hook up troubleshooting procedure for specific problems
Using chart or repair manual, perform all tests indicated
Verify suggested repair with instructor

V. EVALUATIONS:

Instructor observation
Student will demonstrate and report results of test

VI. RESOURCES:

Shop manuals
Textbooks
Troubleshooting charts

VII. SPECIAL NOTES:

Safety glasses or goggles
Underhood safety

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSIONS SYSTEM FUNCTIONS

TASK: K-6 Repair Defective Components

II. INTRODUCTION:

In the early 1960's, government emission standards were set. Because of these standards, automobile emission controls were developed to reduce pollution. Therefore, these controls must be kept in good condition.

III. PERFORMANCE OBJECTIVES:

Following repair manuals, the student will learn to repair defective components.

IV. STUDENT LEARNING ACTIVITIES:

Student will identify faulty part, and with instructor's assistance will repair defective component.

V. EVALUATIONS:

Instructor observation
Student will demonstrate procedure for repairing the part

VI. RESOURCES:

Repair manuals

VII. SPECIAL NOTES:

Safety glasses or goggles
Underhood safety

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSION SYSTEM FUNCTIONS

TASK: K-7 Replace Defective Components *

II. INTRODUCTION:

Once a component has been identified as having a fault, a technician must be able to replace the component if this proves to be the most economical and practical repair procedure.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Obtain access to faulty component.
Locate and read any manufacturer's information on proper removal procedures.
Remove defective component.
Order new component.
Compare new component to old component.
Save old component for customer or core.
Install new component and test operation.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to replace a faulty emission system component using appropriate hand tools and verify repair.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to locate and replace a faulty emission system component with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automotive engine system.
Drop light

VI. RESOURCES: (continued)

Basic hand tools
Replacement parts as necessary

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: K CONDUCT EMISSION SYSTEM FUNCTIONS

TASK: K-8 Verify Repairs

II. INTRODUCTION:

Once a component in the emission system has been repaired or replaced the repair must be verified in order to maintain high service quality standards and good customer relations.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Locate and verify that component has been repaired/replaced.
Reconnect any test equipment if necessary and check that readings are within manufacturer's specifications.
Confirm that all surrounding components, shrouds, and fasteners are properly in place.
Operate new component.
Road test if appropriate.
Record repair on work order.
File work order.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to verify the repair of an emission system component using manufacturer's specifications and other live tests as necessary.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to consistently verify any repairs made to an emission system with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automotive emission system.

VI. RESOURCES: (continued)

Drop light
Basic hand tools
Torque wrench
Gas analyzer

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: L CONDUCT FUEL SYSTEM FUNCTIONS

TASK: L-1 **Identify Fuel System ***

II. INTRODUCTION:

The fuel system has many components. These components start at the fuel tank along the body, and end at the engine. One must have a working knowledge of these components to accurately diagnose and repair the system.

III. PERFORMANCE OBJECTIVES:

The student will be able to identify all components within fuel system, function of each, and type of system.

IV. STUDENT LEARNING ACTIVITIES:

Identify fuel tank
Identify fuel lines and hoses
Identify fuel filter
Identify fuel pump
Identify carbureted system
Identify fuel-injected system

V. EVALUATIONS:

Given appropriate instruction and demonstration, the student will be able to identify the components, and functions on a fuel system.

VI. RESOURCES:

Textbook
Service manual
Manufacturer's service manual

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: L CONDUCT FUEL SYSTEM FUNCTIONS

TASK: L-2 Perform Visual System Check *

II. INTRODUCTION:

Fuel system problems such as flooding, power loss, and poor mileage can be caused by such problems as leaks, loose fittings and pinched lines. These problem can be detected by visual inspection without the aid of any special test equipment.

III. PERFORMANCE OBJECTIVE:

The student will be able to detect visible problems by a visual inspection of the system.

IV. STUDENT LEARNING ACTIVITIES:

Raise and support vehicle
Inspect fuel tank, lines and hoses for leaks
Inspect fuel lines and hoses for restrictions
Inspect fuel pump for leaks
Inspect components under the hood for leaks
Inspect fuel filter and connections for leaks

V. EVALUATIONS:

Given appropriate instruction and demonstration, the student will be able to detect visible problems by a visual inspection.

VI. RESOURCES:

Service manual
Textbook

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: L CONDUCT FUEL SYSTEM FUNCTIONS

TASK: L-3 Diagnose Fuel System

II. INTRODUCTION:

Many different types of fuel system are used on today's vehicles. Customer input and the use of texts that include flow charts will help locate problem areas.

III. PERFORMANCE OBJECTIVES:

Use customer input to diagnose problem
Use flow charts provided in text for troubleshooting
Accurately identify problem areas

IV. STUDENT LEARNING ACTIVITIES:

Practice on shop modules
Use shop manuals
Watch videos on diagnostics

V. EVALUATIONS:

Accurately identify problem areas
Use safety equipment and safety precautions

VI. RESOURCES:

Shop manuals
Video tapes
Shop modules

VII. SPECIAL NOTES:

Safety precautions must be used.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: L **CONDUCT FUEL SYSTEM FUNCTIONS**

TASK: L-4 **Isolate Defective Components**

II. INTRODUCTION:

A systems of checks can be used to isolate defective components. Isolating a problem component is accomplished by following a diagnostic chart in the vehicle's service manual. Each part is checked in sequence and a determination is made as to which component is causing any problem.

III. PERFORMANCE OBJECTIVES:

Use diagnostic or flow charts to isolate problem
Use safety procedures for ventilation and explosive materials
Use test equipment to diagnose and isolate problem parts

IV. STUDENT LEARNING ACTIVITIES:

Use flow charts and other information provided in manuals
Practice on shop modules
View video tape of fuel systems

V. EVALUATIONS:

Demonstration of diagnostic procedures
Safety precaution when testing
Ability to isolate problem components

VI. RESOURCES:

Service manual
Video tapes
Class discussions
Shop modules

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: L CONDUCT FUEL SYSTEM FUNCTIONS

TASK: L-5 Repair Defective Components

II. INTRODUCTION:

When repairing fuel system components, student guidelines must be followed to insure that components function correctly and do not leak. Manufacturer's specifications must be used. The vehicle should be road tested before being returned to the customer.

III. PERFORMANCE OBJECTIVES:

Repair components following manufacturer's specifications
Test repaired components when reinstalled in vehicle
Follow all safety precautions

IV. STUDENT LEARNING ACTIVITIES:

Use service manuals
Practice on shop modules
View video tapes of component repairs

V. EVALUATIONS:

Demonstration of repair methods and procedures following all safety precautions.

VI. RESOURCES:

Service manuals
Video tapes
Shop manuals

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: L CONDUCT FUEL SYSTEM FUNCTIONS

TASK: L-6 Replace Defective Components *

II. INTRODUCTION:

Before a student can replace defective components he/she must be able to accurately test the varied components and identify the defective ones.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

- Locate the defective component
- Accurately test the component
- Properly replace the component

IV. STUDENT LEARNING ACTIVITIES:

Use shop cars to locate, test, and replace fuel system components on
Repair car in a safe and proper sequence as by the repair manual

V. EVALUATIONS:

Shop car will run after repair
Quiz/test will demonstrate students knowledge of test procedure
Verbal quizzing of students

VI. RESOURCES:

Films
Textbook
Repair manual
Car to practice on

VII. SPECIAL NOTES:

Question student before, during and after exercise
Watch for proper tool use, test procedure, and reference use
Watch for safe work habits

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: L CONDUCT FUEL SYSTEM FUNCTIONS

TASK: L-7 Verify Repairs

II. INTRODUCTION:

After repairing or replacing any parts it is necessary to verify that you have repaired the problem. Check to be sure all connections, clamps, wires, and hoses are tight and not leaking and that the vehicle runs properly.

III. PERFORMANCE OBJECTIVES:

Vehicle runs and operates properly
All wires and hoses are routed and clamped into place
No leaks, rattles, or vibrations

IV. STUDENT LEARNING ACTIVITIES:

The student will check repairs made by other students.
The student will identify potential problem areas on mock-ups.

V. EVALUATIONS:

Verbal questioning of student about repairs
Written tests
Watching the student's technique in checking the repair
Successful repair

VI. RESOURCES:

Fuel line and component drawings in repair manuals
Textbook
Mock-ups
Live cars

VII. SPECIAL NOTES:

Double check all lines, clamps, connections, and wires with student
Check with student the component repair or replacement
Road test the car with the student
Above all else stress safety around volatile fluids

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: M CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS

TASK: M-1 Identify Manual Drive Train Components *

II. INTRODUCTION:

The manual drive train consists of manual transmission drive shaft, rear axle, or manual transaxle and drive axles and constant velocity joints. The student should be able to identify which components are on which vehicle.

III. PERFORMANCE OBJECTIVES:

Given instruction and demonstration, the student will be able to identify each component of a manual drive train.

IV. STUDENT LEARNING ACTIVITIES:

Locate and identify transaxle
Locate and identify manual transmission
Locate and identify rear axle
Locate and identify drive shaft
Locate and identify CV joint

V. EVALUATIONS:

Given proper instruction and demonstration, student will be able to identify all manual drive train components with 100% accuracy.

VI. RESOURCES:

Front-wheel drive vehicle
Rear-wheel drive vehicle
Light or suitable lighting device
Safety stands

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: M CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS

TASK: M-1 Identify Manual Drive Train Components *

II. INTRODUCTION:

In order to properly repair or diagnose drive train problems, a student will have to be able to identify manual drive train components.

III. PERFORMANCE OBJECTIVES:

Identify the following drive train components:
clutch assembly;
manual transmission or transaxle;
drive shafts or drive axles; and
final drives.

IV. STUDENT LEARNING ACTIVITIES:

Introduce the student to various types of automotive drive trains.

V. EVALUATIONS:

Given proper instruction and demonstration, the student should be able to identify all components of the manual drive train by pointing them out on a vehicle or written examination with 100% accuracy.

VI. RESOURCES:

Various automobiles
Chilton's Manual Transmission Repair Manual
Automotive textbook

VII. SPECIAL NOTES:

Always apply shop safety rule and procedures by using safe practices.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: M CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS**

TASK: M-2 Perform Visual Check *

II. INTRODUCTION:

A student should be able to check all manual drive train components in order to identify any obvious problems or defects.

III. PERFORMANCE OBJECTIVES:

Given instruction and demonstration, a student will be able to perform a visual check of all manual drive train components for proper operation, and/or damage or leaks.

IV. STUDENT LEARNING ACTIVITIES:

Locate worn or broken components
Locate fluid leaks
Use lifting equipment

V. EVALUATIONS:

Given proper instruction and demonstration, the student will be able to visually check manual drive train components with 100% accuracy.

VI. RESOURCES:

Vehicle with front-wheel drive
Vehicle with rear-wheel drive
Lifting devices
Safety stands

VII. SPECIAL NOTES:

Student will observe all lifting safety precautions.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: M** **CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS**

TASK: M-3 **Diagnose Problem Areas**

II. INTRODUCTION:

In order to put vehicle back to factory running conditions, a student must be able to road test and diagnose drive train problems.

III. PERFORMANCE OBJECTIVES:

Identify drive train problem area
Listen to customer's complaint
Evaluate information
Road test vehicle
Visually inspect drive train

IV. STUDENT LEARNING ACTIVITIES:

Given a vehicle and proper instruction, the student will listen to customer, road test, and visually inspect vehicle to determine problem area in the drive train.

V. EVALUATIONS:

Given proper instruction and demonstration, a student will diagnose a problem area in manual drive train with 100% accuracy.

VI. RESOURCES:

Problem vehicle
Repair manuals
Proper lifting device
Instructor
Safety stands

VII. SPECIAL NOTES:

Student will use proper lifting safety precautions.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: M CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTION

TASK: M-3 Diagnose Problem Areas

II. INTRODUCTION:

In order to efficiently determine the repairs needed to be made on a vehicles drive train, an automotive technician must know how to diagnose manual drive trains.

III. PERFORMANCE OBJECTIVES:

Determine and locate various drive train:
- slack in drive train;
- slipping in drive train; and
- noise in drive train

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate on vehicle how to check for play in drive train, U-joints, CV joints
Slipping clutch or chatter
Bearing noise in transmission or transaxle
Gear noise in transmission or transaxle
Gear or bearing noise in final drive

V. EVALUATIONS:

Given proper instruction and demonstration and proper tools and manuals, a student will be able to diagnose a vehicle drive train problem with 100% accuracy.

VI. RESOURCES:

Various automobiles
Chilton's Manual Transmission Repair Manual
Automotive textbook

VII. SPECIAL NOTES:

This area of repair may require several years of experience.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: M CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS

TASK: M-4 Perform External Adjustments

II. INTRODUCTION:

In order for a vehicle's manual drive train to engage and shift smoothly, the clutch and shift linkage must be accurately adjusted.

III. PERFORMANCE OBJECTIVES:

The student will be able to retrieve information pertaining to clutch adjustments and shifting adjustments and make these adjustments on a vehicle.

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate clutch adjustment for travel and free-play
Demonstrate shift linkage adjustments for throw and lockouts

V. EVALUATIONS:

Given proper instruction and demonstration, the student will demonstrate hands-on (proper) procedure for clutch adjustments and shifting linkage adjustments.

VI. RESOURCES:

Vehicle
Training props -- (Manual drive train components)
Shop repair manuals

VII. SPECIAL NOTES:

Always apply shop safety rules when working on and around vehicles.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: M** **CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS**

TASK: M-5 **Repair Defective Drive Train Components**

II. INTRODUCTION:

Drive train components must be repaired for smooth and quiet operation and complete performance of a vehicle.

III. PERFORMANCE OBJECTIVES:

The student will be able to make repairs to a manual drive train such as:
- clutch systems;
- transmission and transaxle;
- transfer case;
- drive shaft and drive axles; and
- final drive units

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate safety for working under vehicle
Obtain repair manuals
Obtain necessary tools and equipment
Remove and repair clutch assemblies
Remove and repair as necessary transmissions or transaxles
Remove and repair transfer case
Remove and repair drive shaft and driveaxles
Remove and repair final drive unit

V. EVALUATIONS:

Given the proper instruction and demonstration, the student will make these repairs by hands-on demonstration with 100% accuracy.

VI. RESOURCES:

Shop repair manuals
Training props--(manual drive train components)
Vehicles

VII. SPECIAL NOTES:

Always demonstrate proper shop safety procedures. Drive train components can sometimes be very heavy.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: M CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS

TASK: M-6 Replace Defective Drive Train Components *

II. INTRODUCTION:

Drive train components must be properly removed and replaced in order to repair the component being removed or to get to another component to be repaired.

III. PERFORMANCE OBJECTIVES:

The student will be able to remove and replace such drive train components as:

- clutch assemblies;
- transmissions and transaxles;
- transfer cases;
- drive shafts and driveaxles; and
- final drive units

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate safety for working under vehicles
Obtain necessary repair manuals
Obtain necessary tools and equipment
Remove and replace clutch assemblies
Remove and replace transmissions and transaxles
Remove and replace transfer cases
Drive shafts and driveaxles
Final drive units
Remove and replace worn mounts

V. EVALUATIONS:

Given proper instruction and demonstration, the student will demonstrate to the instructor proper removal replacement procedures for manual drive train components with 100% accuracy.

VI. RESOURCES:

Shop repair manuals
Training props--(manual drive train components)
Vehicles

VII. SPECIAL NOTES:

Always apply proper shop safety precautions when working around and under vehicles, also when moving or lifting heavy drive train components.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: M CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS

TASK: M-7 Replace Clutch Assembly *

II. INTRODUCTION:

Once a clutch assembly has been diagnosed as being faulty, a technician must be able to safely and efficiently change all necessary components in the clutch assembly. This job has been complicated by the wide variety of clutch set-ups on modern automobiles with front/rear wheel drive and 2/4 wheel drive combinations.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Locate manufacturer's procedures for replacing the clutch assembly
Properly position vehicle on lift or jack stands to safely remove clutch components
Remove all hardware surrounding clutch
Remove clutch assembly
Remove and replace flywheel for resurfacing if necessary
Order new parts
Verify match of new parts
Using manufacturer's guidelines reinstall clutch components
Reinstall all hardware surrounding clutch
Adjust cable/bleed hydraulic release system
Remove vehicle from hoist or jack stands

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to remove and replace a standard transmission or transaxle using manufacturer's specifications and any other special tools as necessary with 100% accuracy.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to consistently verify any repairs made to a faulty electrical component with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive textbooks and repair manuals
Live automobiles or an accurate mock-up representation of a drive train
Drop light
Basic hand tools
Special tools as necessary

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: M CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS

TASK: M-8 Verify Repairs

II. INTRODUCTION:

Once a component in the Standard Transmission, Transaxle, or Rear Axle Assembly has been repaired or replaced the repair must be verified in order to maintain high service quality standards and good customer relations.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Locate and verify that component has been repaired/replaced
Reconnect any test equipment if necessary and check that reading are within manufacturer's specifications
Confirm that all surrounding components, shrouds, and fasteners properly in place
Operate new component
Road test if appropriate
Record repair on work order
File work order

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to verify the repair of a Standard Transmission, Transaxle or Rear Axle Assembly using manufacturer's specifications and any other live tests as necessary.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to consistently verify any repairs made to a Standard Transmission, Transaxle, or Rear Axle Assembly with 100% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive textbooks and repair manuals
Live automobiles or an accurate mock-up representation of a drive train
Drop light
Basic hand tools
Micrometer
Dial indicator and mounting equipment
Vernier Calipers

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: N CONDUCT AUTOMATIC DRIVE TRAIN COMPONENT FUNCTIONS

TASK: N-1 Identify Automatic Drive Train Components *

II. INTRODUCTION:

Before a technician can repair a problem or service an automatic drive train, he/she must be able to accurately and efficiently be able to identify all major components of the system.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

- Locate and verify the type and model of the automatic transmission.
- Locate and identify the drive shaft(s) and u-joints.
- Locate and identify the differential and final-drive axles.
- Locate and identify the shift linkage and related connections.
- Locate and identify the kick-down cable if so equipped.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to identify all Automatic Drive Train Components.

V. EVALUATIONS:

Upon completion of this task a student will be able to locate and describe, either orally or in writing, all major components of an Automatic Drive Train as specified by an appropriate repair publication with 80% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an Automatic Drive Train.
Drop light
Car hoist

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: N CONDUCT AUTOMATIC DRIVE TRAIN COMPONENT FUNCTIONS

TASK: N-2 Perform Visual Check *

II. INTRODUCTION:

A visual check is a shill which every professional technician uses in order to quickly identify major mechanical failures in an automatic drive train system. The technician must be familiar with many types of systems and know the difference between normal and abnormal wear on components.

III. PERFORMANCE OBJECTIVES:

The student will be able to:

Identify the model of the automatic drive train.
Visually inspect all gaskets and seals for leaks.
Visually inspect for accident damage.
Visually inspect all mounting hardware for damage or wear.
Visually inspect all rubber boots and shrouds for damage or rips.

IV. STUDENT LEARNING ACTIVITIES:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to visually inspect and identify the type of automatic drive train and possible problems.

V. EVALUATIONS:

Working in the automotive shop laboratory with access to shop tools and relevant resources and given an accurate mock-up or live vehicle the student will be able to visually inspect and identify both the type of automatic drive train and possible problems with 80% accuracy.

VI. RESOURCES:

Appropriate and up-to-date automotive text books and repair manuals.
Live automobiles or an accurate mock-up representation of an automatic drive train.
Drop light

VI. RESOURCES: (continued)

Car hoist
Work order

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: N** CONDUCT AUTOMATIC DRIVE TRAIN COMPONENT FUNCTIONS

TASK: N-3 Diagnose Problem Area

II. INTRODUCTION:

To Be Developed

III. PERFORMANCE OBJECTIVES:

IV. STUDENT LEARNING ACTIVITIES:

V. EVALUATIONS:

VI. RESOURCES:

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: N **CONDUCT AUTOMATIC DRIVE TRAIN COMPONENT FUNCTIONS**

TASK: N-4 Perform External Adjustments

II. INTRODUCTION:

Proper adjustment of external linkage and cables on an automatic transmission or transaxle is crucial to optimum performance, safety of a vehicle, (START and PARK) and to avoid premature failure of internal components.

III. PERFORMANCE OBJECTIVES:

The student will be able to retrieve the correct information pertaining to specific mechanical and cable shift linkage adjustments on a specific vehicle.

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate safety precautions while working under raised vehicle
Explain differences between mechanical linkage and cable linkage
Define quadrant indicator
Demonstrate all external adjustments of linkages, indicators, and switches

V. EVALUATIONS:

Given proper instruction and demonstration the student will demonstrate hands-on procedure for external adjustments on a given automatic transmission or transaxle.

VI. RESOURCES:

Shop repair manuals
Training props--(Automatic drive-train components)
Vehicles

VII. SPECIAL NOTES:

Apply shop safety precautions while working under and around a raised vehicle.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. **DUTY: N** **CONDUCT AUTOMATIC DRIVE TRAIN COMPONENT FUNCTIONS**

TASK: N-5 **Repair Defective Drive Train Components**

II. INTRODUCTION:

Automatic drive train components must be repaired in order to have complete shift quality and performance.

III. PERFORMANCE OBJECTIVES:

The student will be able to remove, with proper demonstration and instruction, perform a complete overhaul on an automatic transmission or transaxle.

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate safety precautions while working on vehicle and transmission
Obtain necessary repair manuals
Obtain necessary tools and equipment
Disassemble automatic transmission clean and inspect all components for excessive wear
Inspect and repair any electrical components
Inspect and repair hydraulic valve body
Repair or replace hydraulic pump
Rebuild clutch packs
Rebuild servos
Replace brake bands
Replace bushings and seals
Replace torque converter
Replace vacuum modulator valves
Flush transmission cooling system

V. EVALUATIONS:

Given an automatic transmission, the student will perform hands-on overhaul to an automatic transmission or transaxle with 100% accuracy.

VI. RESOURCES:

Shop repair manuals
Training props--(automatic drive-train components)
Vehicles

VII. SPECIAL NOTES:

Apply shop safety precautions while working with hydraulics.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: N CONDUCT AUTOMATIC DRIVE TRAIN COMPONENT FUNCTIONS

TASK: N-6 Replace Defective Drive Train Components *

II. INTRODUCTION:

Automatic drive train components must be properly removed and replaced in order to repair the component being removed or to get to another component to be repaired.

III. PERFORMANCE OBJECTIVES:

The student will be able to remove and replace automatic drive train components such as automatic transmissions and transaxles.

IV. STUDENT LEARNING ACTIVITIES:

Demonstrate safety precautions while working on vehicle and lifting heavy components.
Obtain necessary repair manuals.
Obtain necessary tools and equipment.
Remove and repair automatic transmission.
Remove and repair automatic transaxle.
Replace vacuum modulators.
Replace worn shift linkage and cables.
Replace worn mounts.

V. EVALUATIONS:

Given proper instruction and demonstration the student, will demonstrate to the instructor proper removal and replacement procedures for automatic drive train components with 100% accuracy.

VI. RESOURCES:

Shop repair manuals
Training props--(Automatic drive-train components)
Vehicles

VII. SPECIAL NOTES:

Apply shop safety precautions while working around and under vehicles also when moving or lifting heavy drive train components.

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: N CONDUCT AUTOMATIC DRIVE TRAIN COMPONENT FUNCTIONS

TASK: N-7 Verify Repairs

II. INTRODUCTION:

It's important that a student be able to test a vehicle with an automatic drive train and be able to determine if it's functioning properly.

III. PERFORMANCE OBJECTIVES:

Test drive vehicle
Determine manual drive train operation

IV. STUDENT LEARNING ACTIVITIES:

Listen to lecture on automatic drive train operation
Observe demonstration on normal operation
Observe safe driving habits

V. EVALUATIONS:

Student will be able to test drive a vehicle with a manual operating drive train and determine its operation with 100% accuracy.

VI. RESOURCES:

Automatic drive train vehicle
Place to test drive
Instructor
Owner's manual

VII. SPECIAL NOTES:

Student must have driver's license.

APPENDIX

Units To Be Developed:

- Balance Tires
- Diagnose Problem Area

Student Competency Profile

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: A PERFORM SCHEDULED MAINTENANCE FUNCTIONS

TASK: A-9 Balance Tires *

II. INTRODUCTION:

To Be Developed

III. PERFORMANCE OBJECTIVES:

IV. STUDENT LEARNING ACTIVITIES:

V. EVALUATIONS:

VI. RESOURCES:

VII. SPECIAL NOTES:

AUTOMOTIVE TECHNICIAN

TASK PERFORMANCE GUIDE

I. DUTY: N CONDUCT AUTOMATIC DRIVE TRAIN COMPONENT FUNCTIONS

TASK: N-3 Diagnose Problem Area

II. INTRODUCTION:

To Be Developed

III. PERFORMANCE OBJECTIVES:

IV. STUDENT LEARNING ACTIVITIES:

V. EVALUATIONS:

VI. RESOURCES:

VII. SPECIAL NOTES:

STUDENT COMPETENCY PROFILE

Program Title______________________________ Date Completed____________________

Student's
Name____

RATING SCALE: 3 Mastered - Works Independently
2 Limited Skill - Requires assistance to perform task
1 Skill Undeveloped - Received instruction but has not developed skill
0 No Exposure - No instruction or training in this area

DIRECTIONS: Evaluate the student by circling the appropriate number to indicate the degree of competency reached. Rate each task to reflect employability readiness.

NOTE: (TBD) = These units are to be developed
* = Entry level task

A. PERFORM SCHEDULED MAINTENANCE FUNCTIONS

A-1	Identify Make, Model, Vin, and Year Numbers *	3 2 1 0
A-2	Perform Visual Safety Check *	3 2 1 0
A-3	Perform Chassis Lubrication *	3 2 1 0
A-4	Change Oils and Fluids *	3 2 1 0
A-5	Change Filters *	3 2 1 0
A-6	Check Fluid Levels *	3 2 1 0
A-7	Inspect Tire Pressure and Wear *	3 2 1 0
A-8	Change Tires, Rotate and Mount *	3 2 1 0
A-9	Balance Tires * (TBD)	3 2 1 0
A-10	Lubricate Hinges, Locks, and Weather Strips *	3 2 1 0
A-11	Document Serviced Performed *	3 2 1 0
A-12	Check Vehicle Inspection and Registration Stickers *	3 2 1 0
A-13	Clean Vehicle Interior *	3 2 1 0
A-14	Clean Vehicle Exterior *	3 2 1 0

B. CONDUCT EXHAUST SYSTEM FUNCTIONS

B-1	Diagnose Exhaust Condition *	3 2 1 0
B-2	Repair Defective Components *	3 2 1 0
B-3	Replace Defective Components *	3 2 1 0
B-4	Verify Repairs *	3 2 1 0

C. CONDUCT ENGINE COOLING SYSTEM FUNCTIONS

C-1	Identify Cooling Systems/Components *	3 2 1 0
C-2	Diagnose Cooling System *	3 2 1 0
C-3	Service Cooling System *	3 2 1 0
C-4	Repair Defective Component(s) *	3 2 1 0
C-5	Replace Defective Component(s) *	3 2 1 0
C-6	Verify Repairs *	3 2 1 0

D. CONDUCT BRAKE FUNCTIONS

D-1	Identify Brake System *	3 2 1 0
D-2	Diagnose System Condition *	3 2 1 0
D-3	Perform Mechanical Function Check *	3 2 1 0
D-4	Perform Vacuum System Check *	3 2 1 0
D-5	Perform Electrical System Check *	3 2 1 0
D-6	Perform Hydraulic System Check *	3 2 1 0
D-7	Repair Parts	3 2 1 0
D-8	Replace Parts *	3 2 1 0
D-9	Verify Repairs *	3 2 1 0

E. CONDUCT BODY COMPONENT FUNCTIONS

E-1	Identify Chassis/Body Components *	3 2 1 0
E-2	Diagnose Chassis/Body Components	3 2 1 0
E-3	Check Wind, Noise and Vibrations	3 2 1 0
E-4	Conduct Visual Check (sheet metal, fixed glass, windows, door locks) *	3 2 1 0
E-5	Inspect for Water Leakage *	3 2 1 0
E-6	Adjust Lighting *	3 2 1 0
E-7	Adjust Body Fits	3 2 1 0

E-8	Repair Defective Components	3 2 1 0
E-9	Replace Defective Components	3 2 1 0
E-10	Verify Repairs *	3 2 1 0

F. CONDUCT STEERING/SUSPENSION SYSTEM FUNCTIONS

F-1	Identify Steering/Suspension System *	3 2 1 0
F-2	Identify Problem Area/Type *	3 2 1 0
F-3	Perform Visual System Check *	3 2 1 0
F-4	Diagnose Steering System	3 2 1 0
F-5	Diagnose Suspension System	3 2 1 0
F-6	Repair Defective Components	3 2 1 0
F-7	Replace Defective Components *	3 2 1 0
F-8	Perform Alignment	3 2 1 0
F-9	Verify Repairs	3 2 1 0

G. CONDUCT ELECTRICAL SYSTEM FUNCTIONS

G-1	Identify Electrical System *	3 2 1 0
G-2	Identify Problem Area	3 2 1 0
G-3	Perform Visual Check *	3 2 1 0
G-4	Analyze Charging System	3 2 1 0
G-5	Analyze Starting System	3 2 1 0
G-6	Analyze Ignition System	3 2 1 0
G-7	Analyze Chassis/Body Electrical	3 2 1 0
G-8	Test Problem Area Components	3 2 1 0
G-9	Repair Defective Components	3 2 1 0
G-10	Replace Defective Components *	3 2 1 0
G-11	Verify Repairs	3 2 1 0

H. CONDUCT ACCESSORY SYSTEM FUNCTIONS

H-1	Identify Accessory Systems *	3 2 1 0
H-2	Identify Problem Area/Type	3 2 1 0
H-3	Test Electrical Functions	3 2 1 0
H-4	Test Mechanical Functions	3 2 1 0
H-5	Test Vacuum System	3 2 1 0

H-6	Isolate Noises	3 2 1 0
H-7	Repair System Problem	3 2 1 0
H-8	Replace System Components *	3 2 1 0
H-9	Verify Repairs	3 2 1 0

I. CONDUCT AIR CONDITIONING/HEATING SYSTEM-FUNCTIONS

I-1	Identify Heating/Air Conditioning Systems *	3 2 1 0
I-2	Perform Visual/Hands-On Check *	3 2 1 0
I-3	Test Mechanical Operations	3 2 1 0
I-4	Test Electrical Operations	3 2 1 0
I-5	Test Vacuum System and Actuators	3 2 1 0
I-6	Test Temperatures in Circulation System *	3 2 1 0
I-7	Test System for Leaks	3 2 1 0
I-8	Repair Defective Components	3 2 1 0
I-9	Replace Defective Components	3 2 1 0
I-10	Charge Air Conditioning Systems	3 2 1 0
I-11	Verify Repairs	3 2 1 0

J. CONDUCT ENGINE MECHANICAL FUNCTIONS

J-1	Identify Engine Type *	3 2 1 0
J-2	Analyze Mechanical Operation	3 2 1 0
J-3	Perform Visual Components Check	3 2 1 0
J-4	Identify Engine Problem Area	3 2 1 0
J-5	Check for Unusual Noises	3 2 1 0
J-6	Analyze Engine Systems	3 2 1 0
J-7	Isolate Problem Components (Tear Down/Inspect)	3 2 1 0
J-8	Repair Defective Engine Components	3 2 1 0
J-9	Replace Defective or Engine Components	3 2 1 0
J-10	Verify Repairs	3 2 1 0

K. CONDUCT EMISSIONS SYSTEM FUNCTIONS

K-1	Identify Emissions Systems *	3 2 1 0
K-2	Perform Visual System Check *	3 2 1 0
K-3	Perform Functional Check of System	3 2 1 0

K-4	Analyze Exhaust Gasses	3 2 1 0
K-5	Diagnose Problem Area	3 2 1 0
K-6	Repair Defective Components	3 2 1 0
K-7	Replace Defective Components *	3 2 1 0
K-8	Verify Repairs	3 2 1 0

L. CONDUCT FUEL SYSTEM FUNCTIONS

L-1	Identify Fuel System *	3 2 1 0
L-2	Perform Visual System Check *	3 2 1 0
L-3	Diagnose Fuel System	3 2 1 0
L-4	Isolate Defective Components	3 2 1 0
L-5	Repair Defective Components	3 2 1 0
L-6	Replace Defective Components *	3 2 1 0
L-7	Verify Repairs	3 2 1 0

M. CONDUCT MANUAL DRIVE TRAIN COMPONENT FUNCTIONS

M-1	Identify Manual Drive Train Components *	3 2 1 0
M-2	Perform Visual Check *	3 2 1 0
M-3	Diagnose Problem Areas	3 2 1 0
M-4	Perform External Adjustments	3 2 1 0
M-5	Repair Defective Drive Train Components	3 2 1 0
M-6	Replace Defective Drive Train Components *	3 2 1 0
M-7	Service Clutch Assembly *	3 2 1 0
M-8	Verify Repairs	3 2 1 0

N. CONDUCT AUTOMATIC DRIVE TRAIN COMPONENT FUNCTIONS

N-1	Identify Automatic Drive Train Components *	3 2 1 0
N-2	Perform Visual Check *	3 2 1 0
N-3	Diagnose Problem Area (TBD)	3 2 1 0
N-4	Perform External Adjustments	3 2 1 0
N-5	Repair Defective Drive Train Components	3 2 1 0
N-6	Replace Defective Drive Train Components	3 2 1 0
N-7	Verify Repairs	3 2 1 0